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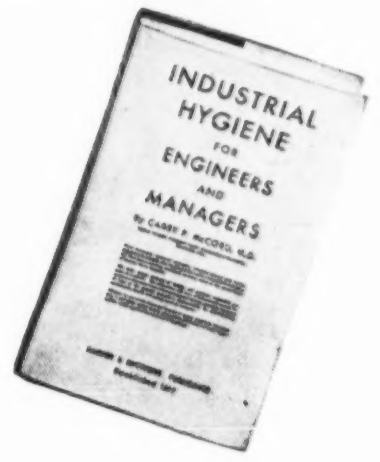

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Fume-fed with self-superiority!
I stand up for the common coarse-as-clay
Existence,—stamp and ramp with heel and hoof
On solid vulgar life, you fools disown!
Make haste from your unreal eminence,
And measure lengths with me upon that ground

The Journal of Traumatic Surgery and
Industrial Medicine
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Whence this mud-pellet sings and summons you!
I know the soul, too, how the spark ascends
And how it drops apace and dies away.
I am your poet-peer, man thrice your match!
I too can lead an airy life when dead,
Fly like Kinesias when I'm cloud-ward bound;
But here, no death shall mix with life it mars!"

—BROWNING.

The Law, the Science and the Economics of Industrial Health

Volume 3 MAY, 1934 Number 5

Continuous Radiant Heat Therapy

—in Osteomyelitis of Metacarpals, Metatarsals and Phalanges—

by

M. S. CORBETT, M.D.
and
M. M. TAYLOR, M.S., M.D.

THE RESULTS obtained in the treatment of osteomyelitis of the metacarpals, metatarsals and phalanges have inevitably left much to be desired.

A comparison of the various procedures and their relative values may be found in a paper by Dr. Max Thorek, entitled, "Comparative Values of Various Treatments of Osteomyelitis with Special Reference to Aluminum Potassium Nitrate Method," published some time ago in *Archives of Physical Therapy, X-Ray and Radium.*

The methods discussed there were:

1. Filling cavities with bismuth paste, etc.
2. Carrell Dakin antiseptic irrigation.
3. Filling cavities with muscle or fascia and primary closure.
4. Orr's continuous dressing method.
5. Physical therapy.
6. Baer's maggot treatment.
7. Aluminum potassium nitrate method.

The method here described was begun about 15 years ago and has been used successfully in 75 to 100 cases.

The lamps we employ have cylindrically-shaped reflectors of about 18-inch focal distance. This allows the continuous use of the radiation without the development of too high a temperature. The effect produced here is due to the penetrating radiant energy of the light ray and not to the heat. Cases were formerly checked by simultaneous use of this method and by heat oven baking. Most cases had also had long periods of application of heat by hot bathing and packing. This method has not been found successful in the large bones of the extremities where thicker tissue exists.

In the new type of light weight stand which was manufactured for us, ordinary 60-watt electric bulbs are used as the lighting element. This type of lamp with light weight base can readily be transported and used in the home, when the patient can be depended upon and cooperates.

The lights are used routinely for 10 to 15 hours straight throughout the day. The hand is placed on a sterile towel, and given continuous treatment. This continues for two to four weeks according to the amount of bone involvement and rarefaction. Old cases which have been incised, drained and treated with hot bathing for three to five weeks before they are seen respond very readily. It is well to use a cotton glove to protect the rest of the hand from the heat, cutting out a window over the affected part. After the day's treatment the finger is dressed for the night with moist magnesium sulphate dressing.

The discharge generally decreases rapidly, so that it is practically stopped, often in three days to one week. The bone iteself heals slowly and especially here, where all soft tissues have been devitalized and deprived of their proper blood supply with long continued swelling and the pressure of inflammatory products. This condition in the soft tissues is described in a paper by Dr. M. M. Taylor, entitled "A Histopathological Study of the Changes Produced in the Soft Tissues of the Hand by Cellulitis Complicated by

Osteomyelitis," which was submitted for fulfillment of requirements for Masters Degree at the Graduate School, University of Illinois in 1931.

Quoting: "Pathology in the hand is similar to that found elsewhere except in result, which is so profoundly influenced by anatomical structure. The skin under these conditions almost always shows a hyperkeratosis and the papillary and reticular layers are thickened. The cutis is often densely infiltrated with inflammatory cells, which are plasma cells, if it is fairly long continued process. The cutis may also show considerable edema. The inflammation sometimes extends up into the papillary layer, with all tissues showing edema and infiltration with plasma cells, round cells and histiocytes. The deep reticular layer of the cutis may be very edematous.

"This hyperkeratosis and thickening of the skin further accentuates the retention of inflammatory products.

"The loose subcutaneous tissue is generally edematous and infiltrated with numerous pus cells if early in the course, or with swollen histiocytes and large mononuclear cells if late. It sometimes shows an increase in the number of blood vessels present and extravasation of blood over the entire area. In places it may be replaced by fibrous tissue which, while often obliterating the larger vessels carries in with it a numerous new growth of capillaries.

"This tissue with its edema and fibrosis, leads to compression of blood supply and later to fibrotic interruption of nerves and contracture.

"The muscle sheaths are destroyed in many places, and the fibers are shrunken. The striations are absent and the nuclei pycnotic or absent. Scattered between the bundles, and sometimes even between the fibers themselves, are dense accumulations of lymphocytes, plasma cells and histiocytes. In more severe and advanced cases there is complete destruction of part of the muscle bundles, with areas of debris and necrotic tissue among certain muscle bundles, which are destroyed by dense accumulations of pus cells. Blood may often be extravasated among the muscle bundles or between the individual fibers. The muscular tissue is often broken into strands and looks as if lined on all sides by lymphocytic infiltration. In certain places the infiltration breaks through and the continuity of the muscle bundle is completely obliterated. This especially happens to muscles in this region, first because there is such a shallow layer of subcutaneous tissue, and, second, because the fascial capsules of the palm are so firm that, unless drained early by surgery, inflammatory products are enclosed and develop a high pressure, which tends to make the process burrow deeper into the muscle seeking an outlet rather than discharging onto the surface. In the hand with small muscles and limited field of motion a high specific disability results from fibrous replacement and contracture during healing.

"The blood vessel walls are often thickened and infiltrated with round cells with definite thickening of the media, or sometimes the pathological changes are most marked in the endothelium and intima. The outer layers of the vessels are almost always infiltrated and show perivascular accumulations of plasma cells, round cells and histiocytes. There is sometimes edema and beginning or complete degeneration of the endothelial or the subendothelial tissue. The original larger vessels, especially of the subcutaneous tissue, may be obliterated by fibrous tissue and the new tissue filled with numerous ingrowing capillaries. If more active the process may show complete erosion and loss of continuity of the small vessels, with extensive blood extravasation into the surrounding tissues. There may even be necrosis of the larger vessel walls as of the radial. This condition is especially liable from the anatomical condition with its confinement of inflammatory products. The distal phalanx is liable to occlusion of blood supply and necrosis.

"The lymphatics often show perivascular infiltration. They may be closed by compression or the lumen may be open and is sometimes clear and in others filled with debris. In many cases the lymphatics seem to be dilated to a larger size than normal, probably in an attempted compensation for the depleted circulation.

"The nerve fibers are well preserved. That is a most striking thing in view of the fact that they have been subject to the ravages of infection occurring with an osteomyelitis for as much as five weeks liable to all the dangers in the same manner as the other tissues. The axones and axis cylinders stain as clear and unharmed as in a normal section. Both axones and myelin are preserved, but the endoneurium and perineural tissues are densely infiltrated with plasma or round cells. The schwann cells are well marked, their nuclei are rich in chromatic material and in some places there are accumulations of large nuclei scattered in the endoneurium. These are nuclei of proliferated fibroblasts. It gives the same pathological picture as that described as interstitial neuritis. The nerve is infiltrated with fibrous tissue and cells and in one place a pseudo-

neuromatous growth appears similar to those which appear after fibrosis and hemorrhagic infiltration following traumatic injury. In some parts there is connective tissue infiltration into the nerve bundle, but the nerve elements maintain their integrity. Here is shown the wonderful vitality which nervous tissue has to withstand ravages which destroy other tissues.

"The tendon sheath is often invaded and broken down and the tendon itself broken and infiltrated with leucocytes. The tendon strands are irregular and in places the continuity may be entirely obliterated. This rupture of the sheath and invasion of the tendon itself explains the loss of function and contracture of tendons which so often follows infections of the hand.

"The bone in these fingers show rarefaction of density in every case under x-ray.

"The foregoing discussion shows how pathology in the hand differs with the anatomy, and should tend to emphasize the care necessary in the treatment of hands with cellulitis and tenosynovitis."

IN ALL cases studied, x-ray of the bone shows rarefaction and lessened density. These range from rarefied areas to ones in which there is complete dissolution of continuity comparable to fracture. In some cases interphalangeal joints are completely rarefied and disorganized. These heal under treatment so far as new bone formation and repair of soft tissue sinuses are concerned, but the joint, however, is ankylosed as the articular membranes have been destroyed in the process. The repair shows a progressive replacement of rarefied bone areas in successive x-rays and in some cases an overproduction in the filling in of defects. Here are some reports of cases:

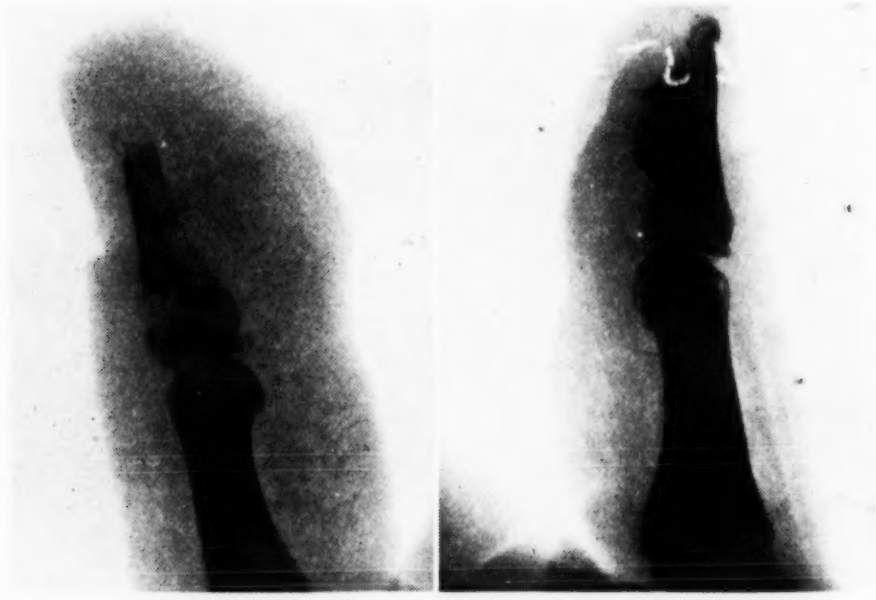

Fig. 1 Fig. 2

CASE 1. In 1931 patient reported to the office with infected right thumb. The entire thumb was swollen and discolored a purplish hue. It appeared almost gangrenous and looked as if it would almost separate spontaneously at the metacarpophalangeal articulation unless amputated. He gave a history of having a sliver in the palmar aspect of the distal phalanx which had become infected and swollen. He had been treated by two different doctors and the thumb had been incised, drained, squeezed, bathed and packed. X-ray revealed rarefaction of the tip and the palmar portion of the distal phalanx with definite dissolution of continuity of bone near the epiphysis. He began long-period treatment with the lamp, and in five to six weeks the thumb had receded to normal size and taken on a normal color, and x-ray revealed complete regeneration of bone with slight over production. There was complete functional recovery without even loss of the nail; see Figs. 1 and 2. This case required a longer period of treatment than is generally necessary, but the result was very satisfactory.

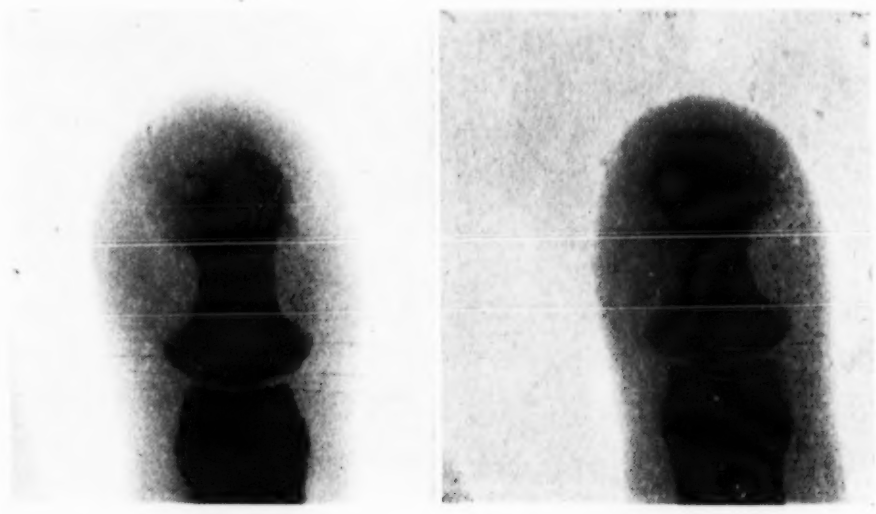

Fig. 3 Fig. 4

CASE 2. A patient entered the office 10/6/31 with infection of the soft tissues on the palmar aspect of the distal phalanx of the thumb. X-ray revealed an osteomyelitis with rarefaction to the distal third of the distal phalanx. He had been treated previously by his family physician, but the incision made was neither long enough or deep enough for proper drainage. The thumb was opened, drain inserted and treated by hot bathing for a few days. Then continuous light treatment was begun. The discharge rapidly subsided, and x-ray studies showed progressive bone improvement. He was discharged on 11/28/31 as completely recovered with no permanent injury; see Figs. 3 and 4.

CASE 3. This case came in on 9/19/33 with an infection of the soft tissues of the palmar aspect of the distal phalanx of the left ring finger. No x-ray was taken on the day of entrance and the finger was treated for two days by bathing in

hot boric acid solutions, X-ray later revealed beginning rarefaction of the spongy portion of the distal phalanx. He was placed under routine lamp treatment and was discharged as completely recovered on 9/28/33. Final x-ray revealed complete bone repair; see Figs. 5, 6, 7 and 8.

CASE 4. X-rays and a general statement of this case are presented. The patient after considerable treatment came in with an old draining sinus of the plantar surface of the foot, after partial amputation had been considered. X-ray revealed a rather extensive destruction of the metatarsophalangeal articulation of the first metatarsal and rarefaction involving the lower half of the first metatarsal. The treatment resulted in complete bony repair and soft tissue

Fig. 5

Fig. 6

Fig. 7

Fig. 8

tissues was present. The finger was opened under local anaesthesia, longitudinally on both dorsolateral aspects of the proximal phalanx. Pus was evacuated, drains inserted and hot bathing instituted. This was on 9/16/33, two weeks after the original injury. X-ray some days later revealed almost complete disorganization of the proximal interphalangeal joint. He was placed under routine treatment with rapid cessation of discharge and more gradual reduction of the brawny type of induration. The swelling of the soft tissues is readily noted in the x-ray. On 11/13/33 he was discharged and ready for work. Subsequent x-ray reveals firm bony replacement and reduction of swelling with ankylosis of the involved joint; see Figs. 11 and 12.

Fig. 9

Fig. 10

Fig. 11

Fig. 12

healing with a functional foot. The joint of course was ankylosed; see Figs. 9 and 10.

CASE 5. This patient came in with chronic draining infection of the soft tissues of the dorsal aspect of the proximal phalanx of the left index finger. He gave a history of having cut the finger with a knife two weeks before, while cleaning chickens. Marked swelling of the soft

CASE 6. This patient received an injury from a saw with deep laceration of the dorsal aspect of the left middle finger extending from the middle third of the middle phalanx to the base of the nail. The matrix of the nail was injured and both distal and middle phalanges fractured. Osteomyelitis developed in the distal phalanx with sinus on the dorsal aspect. The drainage contin-

ued to be profuse, and the entire distal bony phalanx was removed through the sinus opening without incision. Under continuous radiant heat therapy from 1-15-34 until 3-3-34 there was

Fig. 13

entire regeneration of the distal phalanx. The soft tissues were completely healed long before this last date. See Fig. 13 for x-ray showing the end result.

CONCLUSION: Osteomyelitis of the smaller bones, phalanges, metacarpals and metatarsals may be successfully treated by continuous radiant heat therapy.

The Unreliability of the Physical Examination in the Diagnosis of Silicosis

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IT IS generally known, of course, that a good roentgenogram of the chest is the only reliable method of diagnosing silicosis. Nevertheless in these days of general interest in the disease it may not be amiss to point out the really striking discrepancies which occur between symptoms and physical signs and pulmonary fibrosis as shown by the x-ray. References to such discrepancies are frequent in the literature. Two studies in which the author recently participated emphasized them anew.

In a study of silicosis among rock drillers in the vicinity of New York, for example,[1] 25% of those whose x-rays showed unmistakable silicosis had no symptoms whatever. In a recent study of granite workers[2] in the same locality six cases out of 17 with advanced silicosis had no symptoms. Symptoms, while significant when found, do not by any means indicate absence of silicosis by their absence.

The same thing is true of the physical examination. Routinely one looks for diminution in chest expansion. But actually the chests of many workers tend to become more or less rigid, and a measurement of a given individual's expansion is of little importance unless one knows what it was before exposure to dust. In the study of rock drillers already referred to more than half of the cases without silicosis were limited to two inches or less in chest expansion, and among the stone cutters the average expansion in the negative group was 2.4 inches. In the Bureau of Mines Study of Silicosis and Tuberculosis among Miners of the Tri-State District of Oklahoma, Kansas and Missouri,[3] the negative group had an average chest expansion of 3.2 inches, while the group with third stage silicosis had an average expansion of 2.8 inches, a difference between the two of only four-tenths of an inch.

Lung signs, i.e. diminished resonance, diminished breath sounds or changes in breath sounds were found among the rock drillers and stone cutters to be equally unreliable indicators of fibrosis. In 25% of the men with well developed silicosis in both studies the lungs were apparently normal by physical examination.

The uncertainty of the physical examination is well illustrated by the incident reported by Watkins-Pitchford where, of a group of 541 miners who had been receiving compensation for silicosis on the basis of a physical examination alone, 41% were found not to have it when x-rays were introduced.

The usual tests of lung function are equally unrevealing because of the marked individual differences that occur. Among the granite cutters four individuals with advanced silicosis had vital capacities, for instance, more than 92% of normal calculated on the basis of height.

It is evident that a physical examination is somewhat of a luxury where large groups of workers are being examined for silicosis. Where economy of time and expense is desirable it would, therefore, seem entirely legitimate to limit the examination to a good roentgenogram combined with an occupational history.

Duty of Employer in Case of Silicosis

IN SELECTING instrumentalities for the protection of his employee, such as the instrumentalities necessary for the adequate ventilation of his plant, an employer is required to use only "reasonable care." "At common

1 Smith, Adelaide Ross: Silicosis among Rock Drillers, Blasters and Excavators in New York City. *J.I.H.* Vol. XI, Nov. 2, Feb. 1929.

2. In press.

3. Sayers, R. R., Meriwether, F. V., Lanza, A. J., and Adams, W. W.: Silicosis and Tuberculosis Among Miners of the Tri-State District of Oklahoma, Kansas and Missouri. *U. S. Bureau of Mines, Technical Paper 545.* Washington, 1933.

law," says the U. S. Circuit Court of Appeals, 3rd Circuit, citing *Haines v. Spencer*, 167 F. 266, "the employer is not an insurer, and the duty imposed upon him is not to furnish the safest or newest and best machines and appliances, but only to exercise due care to provide those which are reasonably free from danger." Negligence cannot be imputed to an employer who provides machines and appliances such as are generally used in his line of business. The appellee, Butler, claimed that he had contracted silicosis because of his employment with the appellant company, engaged in grading and pulverizing sand. He charged that the company had failed to use reasonable care to provide a proper ventilating system in its plant, to provide him with proper masks, and to give him warning of the dangerous character of his work. There was impressive evidence at the trial, however, said the C. C. A., that Butler's employer had installed the most modern and efficient ventilating system available, one that was superior to similar systems in the majority of industries like that which the employer operated. No evidence was offered by Butler to show that a better system was available and that his employer, in the exercise of reasonable care, should have known of the existence of such a system and acted on that knowledge. The company had supplied Butler with a "Willson" sponge mask, three months after he entered its service, but Butler contended that it should have furnished a better mask, perhaps an air line mask, although the testimony for both parties was that masks of the air line character were still in the experimental stage and not in general use in the industry. A master, said the Court, must instruct and warn his servant as to dangers of which the master knows or ought to know, and of which he knows or ought to know his servant is ignorant. But there was direct evidence that in the present case the defendant and his agents did warn Butler. The act of supplying masks constituted in itself such a warning.

Butler complained that his employer did not warn him of the disease-producing effect of the inhalation of silica dust. But even if this were true, it was not certain, said the Court, that the employer knew that disease was liable to follow, or that he should have known of it in time seasonably to warn his workmen. No evidence was adduced by Butler to show that silicosis normally follows exposure to silica dust, or to show what conditions produce the disease, or how long the disease takes to develop. The Court found it difficult to believe that an employee of normal intelligence who works in dust has to be told that the inhalation of dust of any kind in large quantities is injurious. When such an employee is handed a mask and put to work with other men wearing masks, in a place equipped with artificial ventilators, that is a plain enough warning that dust is deleterious.

The judgment of the trial court in favor of Butler was reversed and the case remanded. *Pennsylvania Pulverizing Co. v. Butler*, 61 F. (2d) 311.

Silica Content of Lungs

THE percentage of silica found in dried lung substance ran from less than 0.3% to a total silica exceeding 2.4% of dried lung substance. The author points out that of all dusts to which industrial workers may be exposed, "coal dust" in the mines is the most concentrated. This coal dust contains 0.6% or more of siliceous matter which might amount to 50 particles of the same per cc.

The Australian and South African workers have agreed that the "danger limit" for the purer forms of silica is 200 particles per cc. Thus it would appear quite possible for a coal miner to inhale as much as 2 mg. of actual silica during a day's work. Working 250 days a year, 0.5 gm. of silica might reach the lungs in a year and in 10 years as much as 5.0 gm. could be inhaled.

In a study of the lungs of 24 coal miners whose deaths were due to accident or illness and not especially to lung fibrosis, analysis showed an average of 4.1 gm. total silica in the lungs of each man (1.15% of the dried lung). Their total time of exposure to mine dust varied from 20 to 50 years. Thus an important proportion of silica inhaled must have been disposed of by drainage, or excreted. Nevertheless, an ordinary coal miner may acquire progressive damage to the lymphatic drainage so that after age 50, a damage to the lung from the silica fraction may assume serious proportions. Experience among the Welsh coal miners certainly indicates 50 to 53 years as the "critical age" in this respect.

Coal dust alone, apart from silica, cannot be regarded as a cause of serious fibrosis of lungs, and such minimal fibrosis as does occur in this class of worker can be explained as due to the action of traces of siliceous dust present even in the high-grade "pure" coal.

Collins and Gilchrist (*J. Indust. Hyg.* 1928:

101) have shown that coal miners have an excessive mortality rate from pneumonia and bronchitis.

The conclusion is that when the silica content of the lungs exceeds 1% of the dried lung substance, the resulting fibrosis clearly contributes toward death. When the silica content exceeds 1.6% the associated fibrosis is sufficient in itself to lead to death.—A. F. Sladen, *Lancet,* (July 15, 1933).—*Abstr. A.J.P.H.* (October, 1933).

Beginning of Silicosis Compensation

THE Spicky Polish Corporation, in the manufacture of silica powder for commercial purposes, ground silica rock into a very fine powder. Marsh, Lange and Woods, while employees of the corporation, were engaged in the process and took part in sacking the product. Marsh's last day of service was February 13, 1928; he died February 14, 1930. His widow filed her claim for death benefits, under the workmen's compensation act, October 20, 1930, alleging that his death was due to silicosis contracted in the course of his employment. Woods last worked on August 3, 1929. He died, August 10, 1929. His widow filed her claim for death benefits, October 20, 1930, attributing death to silicosis. Lange last worked on June 8, 1928, and, naming silicosis as the cause of his disablement, filed his application for disability payments, October 20, 1930. The industrial accident commission held that no occupational injury could have occurred after the last day of employee's service, and that for the purpose of the act the date of injury was the day on which that service terminated. The commission rejected all three claims on the ground that each was barred by the lapse of time, under the provisions of the act. The claimants contended, however, that the date of injury was the date when a medical practitioner could determine the nature of the disease from which the employee was suffering, and appealed. At the request of the Justices of the Court of Appeal the causes were transferred to the Supreme Court of California for determination. That court adopted practically in its entirety an opinion prepared by an Acting Justice of the Court of Appeal.

An occupational disease, said the Supreme Court, is not classed as an accident but as an injury. Under the workmen's compensation act, proceedings for the collection of disability payments must be begun within six months from the date of the injury, and proceedings for the collection of death benefits must be begun within one year from the date of death. In such an occupational disease as silicosis, the exact date of origin cannot be determined; it is the cumulative effect of exposure day after day that produces the injury. Because injury in the statutory sense is referable to a period of time rather than to a point in time, some ration norm must be adopted for determining the "date of the injury" as a basis for the determination of the statutory period of limitation for the filing of claims. For purposes of compensation, an injury dates from the time when the disease condition causes an incapacity for work. It is then that the employer's liability becomes fixed, for until then the workman had received no injury in the legal sense, even though the seeds of the injury lodged in his body long before. A latent and progressive disease may not culminate in disability until a considerable period after employment has terminated. If the disabling result is delayed, the injury is correspondingly delayed, and the right to compensation does not accrue until disability occurs.

In the case of a latent and progressive disease, such as pneumonoconiosis it cannot reasonably be said that the injury dates necessarily from the last day of exposure to a dust-laden atmosphere. The date of the injury should be deemed the time when the accumulated effects culminate in a disability traceable to the latent disease as the primary cause, and when, by the exercise of reasonable care and diligence, it is discoverable and apparent that a compensable injury was sustained in performance of the duties of employment. To justify an award for disability or death on account of an occupational disease, there must be established an unbroken casual connection between the injury and the employment, or the condition under which the employee is required to carry on his work. When such an unbroken chain of causation is found to exist, all physical consequences flowing from the disease or injury are proper elements for consideration in determining the merits of a claim for compensation or death benefits.

In the case of Woods, application for death benefits was not made until more than a year after his death, and the industrial accident commission properly denied relief. In the case of Marsh, while the application for death benefits was filed within the prescribed time after death, the commission held that death did not occur within one year after the date of the injury, as was necessary under the workmen's compensa-

tion act, to entitle the widow to death benefits. The Supreme Court pointed out, however, that in reaching its conclusion in this case the industrial accident commission fixed as the beginning of the prescribed one year period the date when the deceased was first disabled and not the date when silicosis was or should have been diagnosed as the primary and efficient cause of the disability. The order of the industrial accident commission in this case was therefore annulled and the case remanded, with instructions to ascertain when the prescribed period of limitations began to run in accordance with the rule laid down by the court. In the Lange case, the industrial accident commission made no finding as to the date when silicosis should or could have been discovered as the efficient and primary cause of his disability, and the evidence failed to disclose sufficient data to justify a conclusion as to when a causal connection between the occupation and the disability of Lange was or should have been discovered. This case also was remanded for further consideration. *Marsh et al. v. Industrial Accident Commission of California* (Calif.), 18 P. (2d) 933.

Industrial Plant Surveys

IN RECENT surveys of various types of industrial trades in Baltimore conducted by the Bureau of Environmental Hygiene of the Health Department, the chief health hazards encountered in clothing and tailoring establishments have been found to be the possibility of exposure to carbon monoxide from gas-fired boilers and from defective flexible tubing attached to gas irons. In the survey of the printing trade there were revealed: (1) general use of the common drinking cup and common towel, (2) exposure to chromium compounds in solution in such amounts as are likely to cause dermatitis, (3) the use of improper and defective tubing on gas appliances, (4) the possibility of exposure to lead fumes because of unvented pots containing the molten metal, and (5) inadequate lighting and ventilation in a number of basement shops.

Recommendations made subsequent to the surveys included the outdoor venting of gas-fired boilers utilized for the generation of steam in connection with the use of Hoffman pressing machines and the use of a draft hood to prevent any back draft interference with the combustion of gas. Tests made of a number of hazardous gas appliances have shown that in some instances concentrations of carbon monoxide which were dangerous were being given off.

A series of industrial studies will be continued under the joint supervision of the State Commissioner of Labor and Statistics, Dr. J. Knox Insley, and the Baltimore Health Department, in order to ascertain where additional health hazards are most likely to occur. It is expected that the results will be of value to the manufacturing units which cooperate in making them possible. —*Baltimore Health News* (September, 1933).

Dermatitis in Food Packers

AN investigation of 17 cases of dermatitis of the hands among 80 packers in a vegetable packing plant in 1931, and 11 cases among 60 packers in the same plant in 1932, revealed that all of the cases occurred during the packing season for spinach and peas; later several cases resulted from the packing of tomatoes.

The elimination of this trouble, which has caused loss of time ranging from several days to two weeks among those affected, is of financial advantage to both plant officials and employees. It was, therefore, decided that the industrial hygiene service of the Health Department would include a further study of this problem of the vegetable packing plants in Baltimore which was first referred to in the August, 1932, issue of *Baltimore Health News*.

Dr. Adolph Weinzirl, Epidemiologist of the Health Department, brought to the attention of the Bureau of Environmental Hygiene the fact that a fungus might be the causative agent in these cases as had been discovered to be the case in similar outbreaks in fruit canning factories in the northwestern area of the United States. In an article by Meyers and Thienes, published in the June 27, 1925, issue of *J.A.M.A.*, outbreaks of dermatitis of the hands of fruit packers were demonstrated to have been caused by certain molds. The use of an alcoholic solution of oil of cinnamon (2%) and thymol (5%) was found to be effective in alleviating these infections.

The use of this fungicide solution was therefore recommended to the Baltimore plants as a possible preventive. The results of the study and recommendations of the Health Department have greatly reduced the incidence of these cases. In one plant where they had occurred annually, no cases have developed since the daily use of this solution was inaugurated, and, therefore, a better insurance rating has recently been given this company.—*Baltimore Health News* (November, 1933).

The Medical Department Manual

—The Complete Handbook of Organization, Operation and Routines Representing Actual Experience and Practice of 20 Years—

by

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SECTIONS previously published: I. History of the Medical Department (*January*); II. Physical Property; III. Personnel (*February*); IV. Functions and Routines; V. The Centralized Medical Department; VI. Subjective and Objective Relations; VII. Research (*March*); VIII. Forms (*April*).

Sections in this Issue: IX. General Instructions to Examining Surgeons; X. Classifications of Physical Defects; XI. Classifications for the Reviewing Surgeon.

Sections in Subsequent Issues: XII. Regulations and Requirements Governing Physical Examinations; XIII. Interpretation of Physical Defects of Employees for Department Executives; XIV. Requirements of a Course of Industrial Medicine and Surgery; XV. First Aid; XVI. Sanitation; XVII. The Nurse; XVIII. Industrial Medicine and Surgery; Its Past and Present Status; XIX. How the Medical Department Can Be a Factor in the Reduction of Absenteeism.

IX. General Instructions to Examining Physicians

EFFECTIVE upon receipt, the following instructions will govern examination of applicants for employment by all physicians who have been authorized to conduct this work.

All applicants must undergo a satisfactory physical examination prior to acceptance into the service of the company.

All applicants must bring to the examining physician the physical examination record which bears the applicant's signature thereon, same having been made in the presence of the employing officer. The physician will have the applicant sign his name in his, the doctor's, presence and the two signatures must be the same. If not, the physician must get in touch with the employing officer before he makes the examination.

The examining physician will fill out the physical examination record in ink and enclose same in the addressed envelope accompanying the record, and return to the employing officer by mail or by applicant, if the local manager so desires.

Applicants for employment are not entitled to a second examination unless the same is specifically requested by the employing officer on the regular examination record.

In order to remove from the examining physician the responsibility for approving or disapproving an applicant, with its attendant embarrassment, the examining physician will only make a note on the physical examination record of the physical defects as he finds them and if any of the defects that he has found can be corrected, and it is suggested that the examining physician inform the applicant what physical defects he has found.

Conduct your examination in such a manner that the reviewing surgeon or Chief Surgeon, at a distance, may easily determine the physical condition of the applicant from your report.

Bear in mind that there is an insurance feature connected with employment, both as to life and disability due to sickness or injury. Therefore, an estimate of longevity and probable disability will be made from your examination. Also bear in mind, in making your report, any defects that you may find which may complicate injuries received by the applicant.

Any departure from the normal (of importance), or any defect that may affect the applicant's or the company's welfare, should be noted at the bottom of the records *in detail*.

X. Classification of Physical Defects

PHYSICAL examination of applicants for employment and employees for promotion in railroad service:

Classification:

I. All those handling trains and train signals i.e., motormen, extra motormen, yard motormen, towermen, switchtenders, interlocking men, switchmen and signalmen; electrical department and road department employees who work about moving trains; auto truck drivers and motor bus operators.

II. Conductors, regular guards, extra guards and

student guards; commissary department employees and dining car employees.

III. Station platform guards, crossing flagmen, crossing gatemen, shopmen, merchandise despatch employees, agents, clerks, car cleaners, porters and laborers of all departments.

Requirements:

I

VISION: Normal 20/20 required in each eye without glasses.

HEARING: Normal (whisper at 20 ft., acoumeter or rewind of watch at four feet each ear).

COLOR PERCEPTION: Normal (by Holmgren's worsted color skeins and William's test lantern).

Note: Employees under classification II seeking promotion to Class I must have combined vision of 20/20 provided vision in one eye is not less than 20/40 without glasses.

PHYSICAL DEFECTS: All physical defects tending to impair the efficiency of individual, disqualify.

RE-EXAMINATION: Re-examination of the employees in this class must be made once every two years.

II

VISION: Only those whose vision does not fall below normal in one eye and 20/40 in the other, may be allowed to hold their regular or preferred runs.

HEARING: One-half of requirements for entrance to service.

PHYSICAL DEFECTS: Same as requirements for entrance to service.

III

VISION: Normal 20/20 required in one eye and not less than 20/30 in the other.

HEARING: Normal (whisper at 20 ft., acoumeter or rewind of watch at four feet).

COLOR PERCEPTION: Normal (by worsted and lantern, the same as for Class I).

PHYSICAL DEFECTS: All physical defects tending to impair the efficiency of the individual disqualify.

RE-EXAMINATION: Re-examination of employees in this class must be made every two years.

IV

VISION: Combined vision must be 20/30 and not less than 20/40 in one eye with or without glasses.

HEARING: Same as entrance to service.

COLOR PERCEPTION: Normal (with worsted and lantern).

PHYSICAL DEFECTS: All physical defects tending to impair the efficiency of the individual, disqualify.

Note: Employees over fifty (50) years of age, who require glasses to bring their vision to standard, must be examined every year. Employees who have suffered severe injury or illness must be examined before they re-enter the service.

Disbarment Elements Not Acceptable for Employment or Insurance

THE examining physician should pay close attention in recording his findings, to the following physical defects:

SPECIAL SENSES:

EYE DEFECTS:	Defective vision which cannot be corrected and which defect would become increased in case of subsequent eye injury.
	Defects in eyeball itself, as cataracts, corneal opacities, Argyall Robertson pupils, etc.
	Applicants with trachoma or other inflammatory conditions.
	Narrowed fields of vision.
EAR DEFECTS:	Disease of middle ear.
	Deafness, partial or complete.
COLOR SENSE:	If position requires color interpretation, it must be normal.
	Aneurism.
	High blood pressure.
GENITALS:	Orchitis.
	Epididymitis.
	Varicocele.
	Hydrocele.
	Any venereal disease.
SPINAL:	Tabes.
	Multiple sclerosis.
	Multiple neuritis.
	Paralysis.
	Fixed spine.
GENERAL:	Rheumatism or arthritis.
	Nephritis.
	Diabetes.
	Alcoholism.
	Narcotism.
	Syphilis.
	Gonnorrhea.
	Skull fracture, depression, evidence of exophthalmic or toxic goitres.

Deformities:	Atrophies of.
	Hypertrophies.
	Contractures.
	Curvatures to a marked degree.
Mentality and Nervousness:	High degree of nervousness.
	Disordered mentality.
	Insanity.
	Dementia.
Nose and Throat:	Ozena and chronic nasal diseases.
	Chronic sinusitis, rhinitis, pharyngitis.
	Diseased tonsils. If corrected, no bar.
	Infections and contagious diseases.
	Cancer.
Heart:	Valvular disease.
	Tachycardia, unaccounted for.
	Arrythmea.
	High blood pressure.
	Myocardial and endocardial disease.
Hernia:	Inguinal.
	Umbilical.
	Femoral.
	Scrotal.
	Operative wound hernia.
	All hernae, with or without trusses.
Limbs:	Amputations of.
	Contractions of, that will be conducive to accident or inefficiency.
	Enlargements and atrophies of.
	Varicosities.
	Presence of bone tumor.
	Marked deformities of.
	Ankylosed joints.
	Loss of more than two fingers on a hand. This is to apply only where the applicant will be required to do work necessitating all fingers.
Blood Vessels:	Arterio sclerosis.
	Varicose veins, extensive.
	Hysteria.
	Epilepsy.
Miscellaneous:	Facial disfigurements, if repulsive.
Infection: or Contagious: Diseases:	Defective teeth, pyorrhea with marked pus absorption.
	Feebleness.
	Anemias.
	Applicants with evidences of many operations.
	In female, any chronic pelvic disease.
	Any chronic disease that will impair the health and efficiency of the applicant, such as gastric renal, gall bladder, hepatic or splenic disease.

Defects That May Be Corrected and Approved for Employment

IN MAKING a record of the physical defects found that may be corrected, the examining physician will bear the following in mind:

Overweight or Underweight—Within reasonable limits.

Increased Temperature, 99—Which can be accounted for.

Vision—That can be corrected to conform to standard.

Defects of Hearing—That can be corrected.

Nasal Defects—Corrected by operation or treatment.

Tonsil:—Corrected by operation.

Defective Teeth and Pyorrhea—Corrected by dentistry.

Halitosis—That is amenable to treatment.

Lung Diseases—That are amenable to treatment.

Blood Pressure High or Low—Not of organic nature.

Varicocele, Hemorrhoids—Which can be corrected.

Skin Rashes—That are curable and not infectious or contagious.

Vaccination—

Flat-foot—Depending upon severity and if on feet a great deal.

Varicose Veins of Limbs—Depending upon degree and if applicant is on feet a great deal.

Other conditions that are correctable and not included in the foregoing.

Conclusion

IN ORDER to prevent fraud in subsequent claims for personal injury it is essential that a careful record be made of all defects which do not impair the usefulness of the employee, but that might be aggravated by the service or that might contribute to prolongation in the event that the applicant became injured.

Note carefully all scars and other findings that you may think will be of use to the company in

the future health observation of the applicant.

If there is any doubt on the part of the examining physician as to the interpretation of these instructions, or if he is in doubt as to the defects found, he will advise the employing officer and be guided by his suggestions.

In conducting this examination, the physician should bear in mind always the welfare of the company, the employee and the public that the company serves, and not allow sentiment to play any part in the interpretation of the applicant's fitness to perform the work examined for. The company must always have the benefit of the doubt in regard to a new applicant.

It has been the experience of the company that many of the doctors are placed in an unfavorable position with the applicant, by reason of the doctor being required to determine the applicant's fitness for the work he is to do, in approving or disapproving him. It is our intention to eliminate this embarrassment as much as possible. We are having the examining physician record the complete physical findings, and the matter of approving or disapproving the applicant will be left to the reviewing surgeon. This will place the responsibility on the reviewing surgeon as far as the applicant is concerned, and obviate any unpleasantness that may result if the applicant happens to be a private patient of the doctor making the examination. Earnest cooperation is necessary for the proper functioning of this important work.

XI. Classification for the Reviewing Surgeon

THE reviewing surgeon for the company, whose duty it will be to review and study the applicants' physical examination records, must of necessity be acquainted with the various positions in the company and their attending hazards, so that he may be better qualified to pass on the applicants' fitness to do the work for which they are to be employed. If there is any doubt in the reviewing surgeon's mind as to the hazards of any given position, he should get in communication with the employing officer or district official and get his advice.

In view of the fact that it is the aim of the Medical Department to secure the very best material possible in the form of employees, it is essential that we establish the following classifications of causes for disbarment of applicants for employment. The reviewing surgeon's judgment will govern as to what shall qualify as a disbarment element in the position applied for.

SPECIAL SENSES:

Eye—Disbar defective eyesight (any defect less than 20/30 for each eye without glasses). If the position does not require perfect eyesight and the eyesight can be corrected with glasses, do not disbar. The reviewing surgeon must determine just what sight the position necessitates.

Ear—Perfect range of hearing (rewind of watch at four feet, each ear).

VISION DEFECTIVE—DEGREES:

1st degree—equal to $\frac{20}{20}$ in one; $\frac{20}{40}$ in other.

2nd degree—equal to $\frac{20}{40}$ in one; $\frac{20}{70}$ in other.

3rd degree—equal to $\frac{20}{70}$ in one; $\frac{20}{100}$ in other.

4th degree—equal to $\frac{20}{100}$ in one; $\frac{20}{100}$ in other.

Classifications for the Reviewing Surgeon:

HEARING DEFECTIVE—DEGREES:

1st degree—equal voice at 20 feet; watch at six inches one or both ears.

2nd degree—equal voice at 10 feet; watch at four inches one or both ears.

3rd degree—equal voice at 5 feet; watch at two inches one or both ears.

4th degree—equal voice at 2 feet; watch at one inch one or both ears.

HEART:	Any valvular lesion of the heart.
	Rapid heart, above 100, that cannot be accounted for.
	Irregular heart in any form.
	Intermittent heart in any form.
LUNGS:	Tuberculosis.
	Any acute or chronic involvement of the lungs.
HERNIA: (Rupture).	Any form of rupture regardless of whether truss is worn or not, will be cause for disbarment by the Medical Department.
LIMBS:	Any loss of a part of leg or arm, either with or without artificial limb will be cause for disbarment.
	Paralysis—Any paralyzed or deformed limb, or contracture of any one of the limbs, will not be considered by the Medical Department as eligible. Loss of more than two

	fingers on one hand, which might interfere with performing of the applicant's duties, may cause disbarment.	HEART:	Valvular. Tachycardia—Rapid heart. Arrythmia—Irregular heart. T.B.—Consumption. Emphysema — Enlarged air space in lungs. Asthma. Bronchitis.
	DISBARMENT ELEMENTS:		
ALL GROUPS BARRED FOR	Hernia—2nd degree or more. Varicosities—2nd degree or more. Flat feet — 2nd degree or more. Arterio sclerosis. Endocarditis. Hearing — 2nd degree or more. Tuberculosis. Bronchitis. Emphysema Chronic. Asthma.	HERNIA:	Inguinal—Groin. Umbilical—Navel. Femoral—Below groin.
		LIMBS:	Contractures. Enlargements. Flat feet. Atrophies—wasting. Varicosities.
		VESSELS:	Arterio sclerosis—Hardening of arteries. Varicose veins.
	Classifications for the Reviewing Surgeon:	GENITALS:	Orchitis — Inflammation of testicle. Epididymitis—Inflammation of cord. Varicocele — Varicose veins leading to scrotum.
HERNIA DEGREES:	1st degree—External ring admits tip of little finger; impulses felt. 2nd degree—External ring admits thumb. 3rd degree — External ring patulous; bubonocele. 4th degree—Mass reaches external ring level. 5th degree—Mass scrotal.	GENERAL:	Rheumatism. Nephritis—Bright's disease. Alcoholism. Syphilis. Diabetes.
VARICOSITY DEGREES:	1st degree — Venous mottlings on one or both lower extremities. 2nd degree — Venous cords visible on one or both lower extremities. 3rd degree — Venous cords visible and palpable on both lower extremities.	SPINAL:	Tabes—Locomotor ataxia. Multiple sclerosis, forms of paralysis. Multiple neuritis.
		DEFORMITIES:	Atrophies—Wasting. Hypertrophies — Enlargements. Contractures. Curvatures.
FLAT FEET DEGREES:	1st degree—one or both arches sagging. 2nd degree—One or both arches touch floor. 3rd degree—One or both arches touch floor with eversion deformity.	GENERAL:	All Cases of: Rheumatism, Nephritis, Alcoholism, Syphilis, Diabetes, Locomotor ataxia, Hardening of the arteries, will disbar from employment.
GENITALS:	1st degree — Thickening of cord. 2nd degree — Thickening of cord and dangling testicle and scrotum. 3rd degree — Thickening of cord and dangling testicle and scrotum with laxity.	VENEREAL:	Any and all forms of venereal disease will merit disbarment.
SPECIAL SENSES:	Eye. Ear.	MENTALITY:	Any applicant presenting peculiarity in facial expression, methods, actions or speech,

that will lead the medical examiner to suspect defect of mentality, will be disbarred.

COLOR SENSE: Absolutely perfect in interpretation of the standard railroad colors, will be required.

FACE AND SKIN: No applicant will be passed who has any disagreeable skin infection or eruption on face or body; also any disfigurements or revolting abnormality about face, will be disbarred.

SPINAL: No case of curvature of the spine or hunch-back will be considered.

THE foregoing conditions should also apply to re-examination of old employees, regardless of the department in which they are employed.

We have arrived at these conclusions from investigation of the standards that are in vogue throughout the country in public utility companies. While the foregoing may appear very exacting, still it is the standard under which we have been working in the past.

In connection with the foregoing classifications, it is hoped that the reviewing surgeon will have the cooperation of all the officials of the company in arriving at what is required in the respective positions. It is recommended that an analysis be made of the various kinds of work, and that standards be adopted covering this analysis.

After the reviewing surgeon has passed upon the applicant, he will so designate on the physical examination record and return the same immediately to the employing officer.

Arsenical Poisoning in Industry

By DR. CLAUDE WILLIAM CHAMBERLAIN,*
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ARSENIC was not recognized as a metallic element until the 18th century, but several of its compounds were known from remote antiquity, and the potent properties of these poisons have been so well understood that the pages of crime in literature have been marked with the frequent use of the drug for purposes of murder. The symptoms of its slow insidious effects may be easily diagnosed wrongly by careless physicians, and even today arsenic often plays a part in the domestic murders described in the newspapers. Easily purchased at the drugstore, or washed from sheets of common poison fly-paper, the murderer finds the compound one of the most convenient and available of methods with which to commit his crime. Usually he does not know that a chemical analysis of the corpse will prove the presence of the arsenic.

Although not very abundant, arsenic is one of the most widely disseminated of all metallic elements, few sulphur ores being free from traces of it. In the reduction of the ores, which is accomplished in reverberatory furnaces, special precautions have to be employed to guard the workmen against arsenical fumes and dust. The arsenic is obtained as an impure white powder, which is sublimed until sufficiently pure; and thereafter, by sublimation at a high temperature, the product is formed into a glassy mass. This glass is at first perfectly transparent, but it soon assumes the opaque white appearance that arsenic presents in commerce. Besides being the basis of most arsenical preparations and compounds, it is used in the manufacture of glass for reducing the iron oxide contained in sand. For many generations it has been used for mixing with lead in the manufacture of small gunshot, the alloy dropping in rounder forms than pure lead, which produces tailed drops .

Industrial Medicine lists the following as various industries and types of manufacturing in which arsenic compounds are used: arsenic mining; the manufacture of glass; roasting of arsenic-containing ores; shot manufacture; metal working; the manufacture of arsenic colors, including the preparation of dye stuffs, textile printing and dyeing; manufacture of wall-paper and other colored papers; tanning; the making of oilcloth and artificial flowers; taxidermy; various types of painting and decorating; and the manufacture of fireworks. It should be remembered that various metals, such as zinc, silver, lead, bismuth, and copper contain arsenic as an impurity, and the same principle is true for most of the commercial acids. As has been stated, a compound of arsenic is also used in the manufacture of poison fly-paper.

Dublin and Lieboff give a partial but not exhaustive list of the occupations in which there is exposure to arsenic and its compounds and which are most productive of arsenic poisoning.

*Radio Talk, WCFL, March 9, 1934.

The list includes artificial flower makers; arsenic roasters; bookbinders; candle makers (working with colored products); carpet makers; carroters of felt hats; chargers in zinc smelters; color makers; colored paper workers; compounders of rubber; copper founders; copper smelters; curriers in tanneries; cut glass workers; decorators of pottery; dye makers; electroplaters; enamelers; feather curers and workers; felt hat makers; ferro-silicon workers; fur handlers and preparers; galvanizers; gardeners; glass mixers; glaze dippers and mixers in pottery; gold refiners; insecticide makers; japan makers; jewelers; lead smelters; linoleum color workers; lithographers; mixers of rubber mordanters; paper glazers and hangers; pencil makers (working with colors); pitch workers; pottery workers; press-room workers in rubber; printers; pyrites burners; refiners of metals; rubber tire builders and workers; sealing-wax makers; ship-dip makers; shot makers; sprayers of trees; sulphur burners; sulphuric acid workers; tannery workers; taxidermists; tinners; toy makers; velvet makers; wallpaper printers; wax ornament makers; wire drawers; wood preservers; and zinc miners.

As in exposure to mercury and lead, some workers seem to be immune to the effects of arsenic, while others are very susceptible. Women are more susceptible than men, as a general rule.

Workers in arsenical pigments and other compounds are liable to painful ulcers of the hands or scrotum, less frequently to general poisoning. Inhalation of arsenical dust or vapor, or long continued administration of the drug, leads to redness of the conjunctivæ and eyelids, huskiness of the voice, and digestive disturbances. Erythema of the palms and soles of the feet is frequent, and desquamation may follow; the limbs or trunk are liable to various eruptions, particularly herpes; and a brownish discoloration of the skin (arsenical pigmentation) is often seen. The most serious malady is peripheral neuritis. It differs from that of lead poisoning in affecting the legs rather than the arms, and in being accompanied by marked sensory symptoms, viz., numbness, tingling, and acute tenderness of the muscles. Along with these there are loss of power in the legs and a high-stepping or ataxic gait; and in severe cases the arms are also affected. Recovery is slow.

Industrial Medicine points out as symptoms and clinical findings: pain in the abdomen, usually violent; the occurrence of gas in the stomach; a great deal of nausea followed by vomiting of large quantities of fluid; severe diarrhea; a diminution of urine passed; headache with dizziness; muscular cramps; clammy skin; and feeble pulse. In serious cases there is prostration followed by collapse and coma, and death may occur in 24 hours. The above is presented as a picture of acute arsenic poisoning and a typical clinical picture.

The same publication describes chronic arsenic poisoning as follows: first weakness and general fatigue, with a loss of appetite; general gastric discomfort occurs, either with diarrhea or constipation; nausea with or without vomiting is usually present. In the second phase of the chronic type of arsenic poisoning a common effect is inflammation of the mucous membranes of the body; this usually begins with an inflammation of the eyes or nose. Sometimes a cough develops. There is generally hardening and toughening of the skin, particularly of the hands. In some cases, especially in brunettes, there is a noticeable bronzing of the skin. The hair may fall out or the nails become disfigured. There may be blisters and limbs may swell.

In the so-called third phase of chronic arsenic poisoning there are marked disturbances of sensation in the hands and arms, feet and legs. There is intense headache. Sometimes there are pains in the joints. Occasionally these pains are so severe that even the pressure of bedclothes causes great discomfort. Paralysis develops in the muscles in the back of the legs and the muscles of the feet; this sometimes spreads to the arms and hands.

Once its ingestion ceases, arsenic is rapidly eliminated, and treatment is therefore symptomatic. Alcohol obviously is to be forbidden in any form of neuritis; rest in bed usually is required, and when the sensory symptoms have abated, massage and physiotherapy with occupational therapy. A heart stimulant may be indicated later in the case.

Preventive methods are relatively simple and are dependent upon sanitation for all workers coming in contact with white arsenic, the acids of arsenic, or arsenical compounds of any type. Shower baths at the completion of the day's work should be obligatory. Plants using arsenic compounds in manufacturing processes should be well equipped with dust collectors and ventilators, and workmen where dry products contain arsenic should be provided with respirators.

All workmen should be instructed to wear cotton gloves or leather mittens; leggings or bicycle clamps at the bottoms of their trousers; or, in certain cases, light waterproof aprons. They

should cover all tender portions of the skin, both exposed and unexposed (such as the armpits and scrotum) by a coating of ointment. Separate clothing for work is indicated in many instances.

The skin of exposed workmen should be inspected regularly for the occurrence of abrasions, cuts or scratches on the exposed surface, and such areas properly protected. Arsenic "burns" may be treated with an alkaline wash immediately followed by bland ointment. Where "burns" escape notice and develop into sores, moist dressings of an antiseptic solution may be used; all such cases of "burns" should have immediate medical attention to avoid the absorption of arsenic. It is well to advise all workers to drink very liberal quantities of milk with their meals and to take a mild laxative at least once a week.

It has been found that warm water has a tendency to promote "arsenic burns," so notices should be posted in the shower rooms that the dust should be washed from the body with cold water before turning on the warm shower.

With preventive medicine and sanitary measures, the menace of arsenic poisoning may be entirely controlled, and the work of the industrial physician along these lines means the saving of much money and the prevention of much suffering and many deaths, such as has been the history of arsenic poisoning in the past with industry.

Carbon Monoxide Poisoning*

EACH and every day during the past year more than 2,000 automobiles crashed into other automobiles, telephone poles, trains or other objects, in the United States. To be as exact as statistics will permit, each 24 hours of 1933 saw 2072 cars piled up in accidents; 29,900 persons were killed, and approximately 850,700 people were injured. Speed has been blamed for a third of these crashes, and the action of road-hogs for 14%.

But a few days ago, at the Greater New York Safety Conference, L. T. White, of Cities Service Oil Company, presented some new facts and figures to prove that a little suspected factor was responsible for a large proportion of these accidents.

Mr. White held no brief for speed maniacs, but he pointed out that carbon monoxide gas, in dulling the senses of the drivers, made autoists poor judges of time and distance. He declared that this deadly gas played an insidious part in all motor accidents. To gather evidence, he dispatched trained crews of chemists to roadsides to test automobiles and drivers. With their laboratory apparatus, these experts halted cars on Connecticut highways and made their exact tests. Half of the cars indicated an alarming presence of carbon monoxide, gas that might easily filter into closed cars and do serious harm to drivers and others. In 7% of the cars the gas was present in dangerous quantities.

With this as a clue, the chemists tested city drivers to see if they had ever suffered symptoms of carbon monoxide poisoning. A little more than half of the 1500 interviewed in 15 different cities testified that they got sleepy while driving; 38% got headaches; 28% were dulled mentally; 14% had actually became nauseated at times; 10% had noted perspiration that always precedes collapse. All these are symptoms of carbon monoxide poisoning.

Health authorities have plead in vain with manufacturers of heating and illuminating gas to put some bad-smelling chemical in the latter to warn householders of open or leaking jets. Meanwhile no less than 1000 people a week in the United States die from asphyxiation, largely caused by colorless, odorless, tasteless carbon monoxide.

In spite of the fact that carbon monoxide except for one reaction, is physiologically inert, it does combine with the hemoglobin of the blood, thereby excluding oxygen necessary to life. The toxic action is, therefore, produced through an anoxemia.

Ordinarily carbon monoxide does not appear in nature but results almost entirely from the incomplete combustion of carbonaceous material. Common sources are illuminating gas, coal gas, water gas, the "after damp" of coal-mine explosions, motor exhaust gas and in many instances where there is incomplete combustion of various commercial gas products.

Of considerable interest is the determination of the so-called "normal" carbon monoxide content of the blood. Investigators have now discovered that the average content in the blood of various persons may range up to and including 3% saturation of the hemoglobin. Such quantities are far smaller than those which give rise to appreciable physiological effects. It is further stated that tobacco smoking is apt to be the most conspicuous factor in the finding of carboxy-hemoglobin of individuals under nor-

*Another Radio Talk by Dr. Chamberlain, WCFL, March 23, 1934.

mal conditions, other than exposure to obvious high percentages of carbon monoxide gas.

Observations made by Hanson and Hastings, in the *Journal of the American Medical Association*, confirm the conclusions of Gettler and Mattice along this line. Analyses made on the blood of subjects after smoking from 10 to 15 cigarettes showed a saturation of the hemoglobin with carbon monoxide varying from 3.1 to 4.3%. In this small series, however, no symptoms attributable to the presence of the gas in the blood were encountered.

This research is of particular importance in the estimation of carbon monoxide in the blood of employees exposed to this gas in industrial procedures, for it will be necessary to determine whether they are smokers or non-smokers, and when indicated, allow for a concentration of carbon monoxide in the blood which occurs through smoking habits.

Dudley, Edmed and Frederick report in the *Journal of Industrial Hygiene* that "any composition such as paint, containing linseed oil will, in a confined space such as the sealed compartment of a ship, not only give rise to dangerous concentrations of carbon monoxide but will also, through absorption of oxygen during drying. produce an atmosphere seriously, and in some cases almost completely deficient in oxygen."

The chief causes of carbon monoxide poisoning aside from motor exhaust gases are of a domestic nature. Bedroom heaters without flues and water heaters in bathrooms without flues are frequent causes. In some cases kitchen gas ranges, gas logs or hot plates are involved, as well as a leakage of gas. Defective burners are more or less common. In the use of gas burners, people often go to bed with the gas burning, forgetting that when the gas pressure is almost always increased because of less general use during the middle of the night, the flame becomes high and produces relatively more carbon monoxide.

Probably half of the fatalities from motor exhaust gas are due to the motor running in a closed garage. This is aside from those tragedies where exhaust gas has been indirectly responsible for car crashing.

Coal burning furnaces sometimes wipe out an entire family; the recent tragedy of the Dartmouth fraternity house stands out as an example of the dangers from this source.

The first successful effort to use intravenous injections of methylene blue as a remedy for carbon monoxide poisoning was made in the San Francisco Emergency Hospital in 1932. Since that time a sufficient number of cases have been reported where this treatment has been utilized, both in conjunction with cyanide and carbon monoxide poisoning, to justify recommendations for the more general and widespread use of this treatment. There is a similarity in effect upon the circulatory system of cyanide in its various forms and carbon monoxide. Cyanide is used commercially most extensively as hydrogen cyanide.

The work of investigators indicated that methylene blue, upon entering the blood stream takes up hydrogen to become methylene white. Methylene blue is a dye which has enjoyed some medicinal use as an analgesic in neuritis, sciatica, and neuralgia. It has also been used in malaria, and as an antiseptic in urethritis, cystitis, conjunctivitis, and in various skin diseases. It has also been used as a test for kidney functioning. It is a slow, weak germicide.

After taking up hydrogen in the blood stream to become methylene white, it apparently is colorless, odorless, and entirely harmless to the membrane. It regains its blue color when exposed to the air or in contact with hydrogen peroxide.

After intravenous injection in poison cases, blood transfusion or the use of the inhalator may be indicated in some instances.

In dealing with carbon monoxide poisoning it is essential that every effort be made to eliminate delay in administration of the treatment. An emergency kit has been developed for this purpose. The package is compact, carefully packed and sealed, and the contents are fully sterilized and ready for instant use. Such a kit can be safely kept available for many months until an emergency arises demanding its use. The package should always be available for the industrial physician in all industries where there is danger from carbon monoxide poisoning, as in mines or plants where there may be incomplete combustion of various commercial gas products.

A total of three injections into the medium basilic vein of 50cc. each may be safely administered at hourly intervals, or more frequently if necessary. Artificial respiration is usually indicated, and under competent medical supervision, adrenalin may be administered as a further supportive treatment.

Through the introduction of systematic training in methods of artificial respiration and the perfection of the inhalator, substantial progress was made in saving human life. The methylene blue treatment used in conjunction with artificial respiration should soon assume a similar place

of distinction in the history of emergency treatment and first aid work. Enough lives have already been saved by using this new method to justify the immediate investigation of this subject by all who are responsible for such activities as safety, first aid, or industrial medicine.

Injury and Infection Not Simultaneous

THIS was an action on an insurance policy. The insured accidentally pricked her thumb with a pin, Friday, April 18; the puncture remained visible; the soreness increased and the thumb became red. On the Monday following the injury she was unable to work because of the pain in her thumb, and on admission to a hospital it was found that the pain was due to infection. She died on Friday, one week after the day of the accident. Medical testimony tended to show that the germs that caused the infection could not have entered the thumb in the absence of an open sore or wound, and that infection and blood poisoning were a natural result of the injury the insured had received. The insurance policy covered effects resulting directly, and exclusive of all other causes, from bodily injury sustained through external, violent and accidental means. It excluded disability due wholly or in part to disease or bodily infirmity. The trial court directed a verdict in favor of the defendant, on the theory that the plaintiff could not recover under the policy because she had not proved that the pin and the germs entered the thumb of the deceased at the same time, and that, therefore, she had failed to show that death was caused directly and exclusively by accidental means and was not due wholly or partly to disease. The plaintiff appealed to the Supreme Court of Rhode Island, and that court quoted with approval from *Delaney v. Modern Accident Club*, 121 Iowa 528, 97 N. W. 91, 63 L. R. A. 603, in which the insured, following a cut on one of his fingers, died from blood poisoning and erysipelas:

"It seems to us, however, that it is wholly immaterial when or how these specific bacilli which caused the disease known as 'blood poisoning,' which resulted in the death of Delaney, were introduced into the wound, whether at the time it was inflicted or subsequently. Blood poisoning is a disease, just as many other pathological conditions of the human system . . . The simple question is whether the death of Delaney resulted, through natural causes, without the interposition of a new and independent cause, from the cut on his finger. Disease brought about as the result of a wound, even though not the necessary or probable result, yet if it is the natural result of the wound, and not of an independent cause, is properly attributed to the wound, and death resulting from the disease is a death resulting from the wound, even though the wound was not, in its nature, mortal or even dangerous."

The Supreme Court cited also *French v. Fidelity & Casualty Co. of N. Y.*, 135 Wis. 259, 115 N. W. 869, 17 L. R. A. (N. S.) 1011, in which the insured died from blood poisoning following an abrasion of the skin on one of his legs. In that case, on behalf of the insurer, it was argued that the injury was too slight to cause death, and that death was due to an intervening cause, namely, the germs which entered the body through the wound. But the Court said: "It may be apparent, however, that but for the accidental injury there would have been no cause for infection; but for the abrasion, the disease germs could not have entered and produced the fatal result. The wound produced by the accident was therefore the proximate and sole cause of death."

The Supreme Court of Rhode Island therefore sustained the plaintiff's exception to the direction of a verdict in favor of the defendant and remanded the cause for a new trial.—*Pennine v. Peerless Casualty Co.* (R. I.), 164 A. 325.

Compensability of Pneumonia

THE Industrial Commission of Wisconsin awarded Hatfield, an employee of the Yellow Cab Company, compensation under the workmen's compensation act, because it found that he had contracted pneumonia out of and incidental to his employment. The Yellow Cab Company appealed to the Supreme Court of Wisconsin. The expert medical testimony given before the commission, said the Supreme Court, warranted the commission in finding that, although pneumonia germs are prevalent in the throats and noses of many normal persons, pneumonia does not result unless the germs invade the lungs and multiply there. This occurs from a lowering of resistance, which may be due to exposure, alcoholism and reduced vitality following an operation. The commission was warranted in finding also that the claimant's exposure was the logical cause of the lowering of his resistance, which caused the development of pneumonia. Clearly the claimant's pneumonia

was incidental and fairly traceable to his employment; he would not have been equally exposed to it apart from his employment. Likewise the chances of the growth of the pneumonia germs and of the resulting pneumonia were substantially increased by the services which he was obliged to render. The fact that such a hazard is incidental also to all similar outdoor activities is no reason for denying the claimant the benefits of the workmen's compensation act. The judgment of the lower court, allowing the award, was therefore affirmed.—*Yellow Cab Co.* v. *Industrial Commission* (Wis.), 246 N.W. 689.

Industrial Compensation in the Soviet Union

By M. DAVIDSON, *M.D.*

DURING a visit to the Soviet Union in 1931 I gathered some data in interviews with officials of the Moscow Central Bureau of Medical Experts, and secured a number of publications on industrial compensation in that country. Because of the timeliness of the subject I have made a summary of the material gathered.

Two facts should be emphasized in dealing with any subject in relation to Soviet Russia. One is that the country is a federation of republics which enjoy varying degrees of autonomy. Some have only purely administrative self-government, others stress cultural autonomy, and still others, as in the case of the Ukraine, claim what might be described as dominion status. The largest republic, with almost two thirds of the population, is the Russian Socialist Federation of Soviet Republics. The country as a whole is known as the Union of Soviet Socialist Republics, or the U.S.S.R., or for short the Soviet Union.

For this reason, there is less uniformity in legal procedure than one would expect.

The other fact, and one which has a particular bearing on the development of the compensation system in the Soviet Union, is that the social-economic soviet system has undergone a far-reaching evolution since 1917. It has passed from the early stage of war communism, during the civil war, with conscript labor as one of its features, into the stage of the New Economic Policy, which may be described as state capitalism (although the communists would probably resent that term), when the status of labor became that of a hired commodity. It is now slowly emerging into the third stage of state socialism to be achieved when and if land socialization is achieved. The Soviet Union is, therefore, so far not yet a closed economic system, and labor flows back and forth between the industrial centers and the non-socialized rural labor reservoir. Unemployment, for example, is theoretically not excluded, but it is not evident now except in the form of a lively labor turnover. This second fact explains the changes which the principles and practice of social insurance and of its most important form, industrial accident compensation, have undergone.

The care of the sick and the injured in the U.S.S.R. is financed by three agencies. The first is the Social Insurance Fund, under the jurisdiction of the Commissariat of Labor, for the benefit of the insured industrial and agricultural workers. The second is the Commissariat of Social Welfare, for the sick and disabled in general. The third is the War Commissariat, for the benefit of the disabled soldiers.

The following figures, while not up to date, may help in visualizing some elements of the situation in the U.S.S.R. There were some 12,000,000 workers covered by insurance in 1929, with about a million persons, about half and half, disabled workers and their dependents, receiving compensation. The 1931 budget called for 1,200,000,000 rubles for social insurance. About a third of it is spent in compensation for permanent disability, a third in temporary disability benefits, and a third in medical care. The number of those drawing compensation is rapidly increasing because of the speeding up of industrialization of the country, and also from the country, and also from the program of agrarian socialization which brings more and more farmers under the operation of the insurance laws. The increase is further due to the cumulative effect of a system which does not provide for lump-sum settlements or time-limited compensation. The actual rate of compensation has also been mounting steadily. It was 15 rubles per month for total loss of earning capacity in 1924, and 33 rubles in 1927 (no later data are available.) It apparently varies from year to year in relation to fluctuations in the wage level and to the state of the budget.

Workmen's compensation was introduced at the end of the civil war in 1921, and until 1925 was operated with the system of "schedule" or percentage losses, which was borrowed wholesale from the West, and, in 1925, was superseded by the "group" or "rational" system.

THE SOVIET government argues that the socialist state is concerned only with compensating a worker for loss of earning capacity and not with damage to his body, and that the disabled individual should be compensated, not alone on the basis of functional loss sustained, but also in relation to his occupation and age and the general economic situation he has to face. They further argue that since an individual's earning capacity is not and cannot be a fixed and immutable quantity under any economic system, because of the vicissitudes of technologic and economic reorganization, a fixed compensation is not just, either to the individual or to the state.

The "group" system operates with six groups of permanently disabled workers:

Group 1 includes those totally disabled and helpless, so that they need some one to care for them; these are entitled to 100% of their wages.

Group 2 is composed of those disabled from following any occupation but who are not helpless; they receive the so-called "full pension" or two thirds of their wages.

Group 3 comprises those capable of following their previous occupations but only irregularly; they are given 75% of "full pension."

Group 4 takes in those disabled from following their previous occupation, but capable of following a less remunerative occupation; they receive 50% of "full pension."

Group 5 includes those incapable of following previous occupations, but capable of rehabilitation for a new occupation, with 20% of "full pension."

Group 6 is made up of those who have suffered a reduction of their earning capacity at their normal occupation but not in excess of 15%, and the 15% loss is made up to them.

It will be noted that the basic rate of compensation is the varying "full pension" referred to.

In the case of the eye, to indicate how complicated the "group" system may become, a classification is attempted with reference to the six functions of the visual apparatus: visual acuity for distance; visual acuity for near; peripheral vision, binocular vision; color vision, and light sense, as well as in relation to age and occupation. When the "schedule" system was replaced by the "group" system in 1925 the novices and the younger men resorted to a mere mechanical conversion, and absurdities are recorded of putting men who lost their right arm into the second group and men who lost their left arm into the third group because of a 10% difference in compensation under the "schedule."

While obviously more complicated, and requiring more skilled and longer trained men to handle, the "group" system found general, almost universal, approval at the First all-Union Conference on Problems of Medical Expert Opinions of Disability, held in Kharkov in 1928. There was, however, a tendency noted to simplify the "group" system by reducing it to three groups and incorporating the last four groups into one of partial disability. The reason for the latter was that when "full pension" is small, the lower three groups receive such insignificant compensation that they practically exist only on paper.

THE CARE of the sick, the determination of their temporary disability period, and the expert medical examination for permanent disability pensioning, all come under the jurisdiction of the Commissariat of Health Conservation. The expert medical examination for permanent disability is, however, a distinct institution with separate staffs. These are apart from those handling the treatment of the insured worker, the latter being under the supervision of Medical Control Commissions. There are 500 Commissions or Bureaus of Medical Experts, for determination of permanent disability, some on a full time basis, others on a part time basis, operating throughout the Soviet Union. Each Commission consists of a nucleus of three physicians: an internist, a surgeon, and a neurologist, with a Chairman representing the Central Trades Union Council. Consultants in other specialties are added as required, and women physicians are employed wherever female claimants preponderate. Organizations disbursing the moneys, i.e., the Social Insurance Fund, the Social Welfare Commissariat, and the War Commissariat, sometimes gain representation on the Commissions, although this is generally discouraged.

The Commissions of Medical Experts work from four to six hours daily, and their regular assignment is from 15 to 20 claimants per day. Regardless of the nature of the complaint, the general procedure is for each of the three physicians to examine the claimant separately, referring to other specialists if necessary, and for all to make a joint report. The case is then discussed by the Commission as a whole, and the group to which the claimant belongs is determined by a majority vote. Ten years of clinical experience are required for appointment as an expert examiner on those Commissions.

Commissions have available hospital beds for

observation of special cases, and in Moscow, Leningrad and Kharkov, there are special research institutes for the study of occupational diseases and injuries. The dissatisfied claimant has recourse to re-examination by the same or another Commission within two weeks, and is routinely re-examined annually. In special cases, where deterioration or improvement is expected, he may be re-examined in six months. The members of the Commissions are encouraged to maintain contact with industrial plants by means of tours, conducted under technical guidance in order to familiarize them with the conditions under which the beneficiaries are working, as well as with the Medical Control Commissions which look after the treatment of the sick and injured. Generally, each of the Republics composing the Soviet Union maintains a Central Bureau of Medical Experts to which difficult problems are referred.

With regard to problems of casual relation, the following rules were formulated by Professor Vigdorchik at the Conference referred to, and met with general approval:

1. Great probability of casual relation establishes compensability.

2. Occupation need not be the sole cause. To justify causal relation it is only necessary that occupation be an important contributing cause.

3. Casual relation exists if the disease takes on a more rapid evolution because of occupation.

4. If a disease or injury leaves a defect which leads to another disease, the original disease or injury is the cause.

It must be borne in mind that the line of demarcation separating industrial injuries and occupational diseases on the one hand, from other causes of disability on the other hand, is not as rigid as it is with us, and the problem of casual relation has more of a scientific or bookkeeping significance than legal importance. It becomes important only when the length of exposure in the case of an occupational disease is predetermined by law.

Some diseases not currently regarded by us as occupational are listed as such in the Soviet Union, namely, progressive myopia among jewelers and watchmakers, deafness among riveters, chronic laryngitis among singers and public speakers, varicose veins and pneumoconiosis.

At the same conference, Grinshtain, on the subject of traumatic neurosis, advocates treatment in special sanatoria, an early return to industry and small compensation if disabled. The somatogenic post-concussion cerebrospinal syndromes, which in his opinion are often mistaken for traumatic neurosis, require longer rest after injuries, and, in view of their poorer prognosis, higher compensation. A large number of traumatic neurosis cases investigated by the Leningrad Institute revealed a past history of repeated traumas not necessarily occupational. This is considered not a coincidence, and it is suggested that we are dealing with a chronic progressive condition with the last trauma as the final straw.

On the whole it would appear that while compensation in the U. S. S. R. is perhaps not so generous in terms of money as in most of our states, the Soviet workers also get indirect compensation in the form of old age pensions, vacations, care for a wider range of causes of disability, and health insurance.

Employee Group Protection *

IN GENERAL, it may be said that protection of employees against the hazards of sickness and non-occupational accidents is highly desirable, but whether the medium of protection should be group sickness insurance or an employee benefit association is controversial. Contacts with 283 companies on this subject disclose that they provide group coverage. Of this number, 60% carry group life insurance only; 35% carry both group life and group sickness and disability; 5% carry group sickness and disability only. Thus 114 carry group sickness and disability insurance. The protection afforded employees by 193 companies uses the medium of an employee benefit plan or mutual aid society. That more use the mutual set-up than use group sickness insurance is no real criterion of their respective merits, as mutual aid societies have been operating for more than 50 years, while group insurance is only about 20 years old.

Of the number now using group sickness and disability insurance, 18 at one time operated an employee benefit plan but abandoned it in favor of the insurance. At the same time, nine are now carrying both sickness and disability insurance and are operating employee mutual aid societies. Their unanimous opinion is in favor of the group disability policy, and they have announced their intention to allow the mutual aid societies to pass out of existence and extend the protection afforded by the insurance. New employees in all nine plants are required to participate in the group policy and are discouraged from the mutual aid society.

*Memorandum from the Notebook of an Industrial Consultant.

The indirect benefits of group sickness and disability insurance are, of course, extremely difficult to evaluate. There is every reason to believe that it makes for better relationships between management and employees, that it has some tendency to reduce labor turnover, and that it probably contributes to the general feeling that employers having such insurance offer better working conditions than employers not extending such protection. In other words, it may be possible that group disability insurance exerts all these influences and improves the employer's standing in the labor market, but no factual evidence can be presented on these points. On the other hand, the direct benefits are comparatively simple of measurement.

Reduced absenteeism on account of sickness is the most pronounced of the direct benefits. Impartial investigation by the insurance companies, the use of visiting nurses, and sickness prevention efforts and similar measures, not only contribute to a lower sickness rate but also materially reduce the loss to both employee and employer in the average case of sickness. Furthermore, it has been found that group disability insurance eliminates to a large degree the previously prevailing rates of malingering.

Another direct benefit of group protection is in the elimination of the practice of "passing the hat" among employees for the relief of sick or disabled fellow employees. It also tends to remove the stigma incidental to charitable relief to unfortunate persons.

The disadvantage of the group policy, of course, is in its cost. This depends entirely upon the scale of benefits provided, but on the average is found in many plants to cost between $4 and $6 per employee per year. In some plants employees pay only 50% of the disability insurance cost, but in others employees pay as much as 80% of the total premium amounts, especially when the policy is placed with a mutual company or a participating stock company.

Only estimates may be obtained as to the returns an employer receives in return for his investment in a group sickness policy, but such estimates as have been made indicate that expenditures along this line are more than offset by the savings effected. More convincing, however, is the fact that in contrast with group life insurance, the percentage of employers who have taken out group sickness and disability policies and afterward allowed them to lapse is insignificant, and even in the cases where abandonment has taken place the cause was not related to the merits or lack of merits of the group policy.

Summarizing: the available information indicates that group sickness and disability insurance on the contributory basis is even more to be desired than group life insurance, and that money thus spent results in a saving rather than an expense.

Eyesight Examinations *

THEORETICALLY the plan followed is that the optical company sets up an examination room within the plant and examines the eyes of employees, giving those who need glasses a prescription for them. The employee is then told that he can buy glasses anywhere, but that if he will buy them from the company conducting the examination a lower price will be charged.

Actually the way the plans work out depends almost entirely upon the individual who conducts the examinations. Some men with whom I have come in contact follow not only the letter but also the spirit of the optical company's idea, and do not "high pressure" men into wearing glasses who actually do not need them, nor do they insist that the glasses be purchased from the examining company. Other individuals have been known to recommend glasses when they were not actually required, and to neglect mentioning to the employee that glasses may be purchased from any company other than the one making the examination.

Some eastern companies when approached on the eyesight survey idea, refused to permit the outsiders to enter their plant, but followed out the thought and sent their employees to a local oculist for examination. They had in mind the very wise precaution that only a qualified medical man should be allowed to examine eyes. Approximately the same percentage of defective eyes were found when the examination was conducted locally as when conducted by a surveying company.

Features followed by one company may or may not be followed by others, such, for example, as the grinding of special lenses to suit the individual requirements of employees using glasses so that it becomes unnecessary for a man to wear both glasses and goggles on a hazardous job. If a survey is permitted in a shop it would be well to insist upon special goggles as well as eye glasses.

If the employer will exercise close supervision

*Memorandum from the Notebook of an Industrial Consultant.

of an eyesight survey, much good can be accomplished with a minimum of dissatisfaction. One employer who permitted the survey required each employee examined to report one week following the examination, in order that he might give voice to any expressions of satisfaction or dissatisfaction that he might have in mind. In cases of doubt the eyes of the employee were examined locally, and as a result the entire matter went over very smoothly. Lately the piecework earnings of several employees increased materially following their use of glasses, and there was every reason to believe that accident rates would be lowered.

Courage

"I DEEM it a delightful privilege and a great honor to be accepted as a speculative member of a guild whose code antedates that of General Johnson and the NRA by 2,300 years.

"Under the oath of Hippocrates you have always had an NRA code, the NRA standing for: 'Never Refuse Aid.' I fear, however, in these trying times, that many of your patients have a code of their own and for them the letters NRA stand for: 'Never Reward Aesculapius.'

"In all the world I know of no group of men by whom I would rather be granted the honor of fellowship than yours. Medicine for me is the unobtainable. In it I am as the field mouse longing for the wings of a bird.

"There is an ancient proverb which says that a man at 40 is either a physician or a fool. I have passed well beyond the 40 mark and I am still not a physician.

"In fact, now that I ponder upon it, you men of medicine are the only group left before whom I still stand in awe. Your science is so completely esoteric that I cannot enter into it even when I have all the passwords. I will be honest with you. I could never be a doctor because I lack the especial kind of courage that one must possess to be a doctor. I suppose it may be acquired—like a taste for olives—but I have my doubts. There are so many kinds of courage in this world that a man may be a hero in one instance and a coward in the next.

"For example, there are courageous statesmen, courageous clergymen and even courageous editors. But they speak only opinions. There are courageous soldiers and explorers and engineers and seamen; men in many walks of life who must display cold nerve and physical hardihood.

"But in the practice of medicine there seems to me to be required a unique kind of courage; in fact, in many ways a synthesis of all the others.

"The true physician must have the courage of a priest in being the father-confessor for many sins and yet not lose his faith in his fellows. A general instills courage in his soldiers by his inspiring presence; so it is with the physician. He must keep alive the light of faith not only in his patient but in his patient's family and in himself. His will must dominate when his heart is filled with doubts. He holds a human life in the hollow of his hand and must have the God-given courage to keep that hand cool and steady."—Malcolm W. Bingay, *in Detroit Medical News.*

Toxicity of Carbon Tetrachloride

TOMB and Helmy state that carbon tetrachloride and its closely allied halogen derivatives of the aliphatic hydrocarbons are capable in therapeutic doses of causing fatal intoxication accompanied by acute degeneration of the liver. Fatalities from carbon tetrachloride intoxication occur much more frequently among children and adolescents than among adults, probably owing to an insufficiency of calcium reserves in the young. Immediate poisoning by carbon tetrachloride in therapeutic doses is generally associated with disease of the liver or with other clinical contraindications. Delayed poisoning by carbon tetrachloride in therapeutic doses is generally due to non-elimination of the drug from the intestinal tract, in or without association with clinical contraindications. It can be obviated, when the liver is healthy, by rapid and free evacuation of the drug. Fatal intoxication by carbon tetrachloride in Egypt has been found to be closely associated with ascariasis. Ascariasis in such cases would appear to act in two ways: (1) by causing a mechanical obstruction to the action of the saline purgative and increased absorption of the drug when worms are numerous in the intestine, through "clumping" of the worms, or (2) by diminishing the natural resistance to the drug in cases in which clinical contraindications already exist, either through toxins produced by the worms or owing to the unsatisfactory economic conditions and consequent low state of general nutrition which ascariasis implies. When intoxication by carbon tetrachloride has manifested itself, intensive treatment by intravenous injections of calcium gluconate (Sandoz) is capable of saving life, provided the drug has been thoroughly evacuated from the intestinal canal. The traces of car-

bon disulphide found in medicinal carbon tetrachloride are of no toxicologic significance.—*Journal of Tropical Medicine and Hygiene*, London, 36:329-344, (November 1, 1933); Abstr. *J. A. M. A.* (March 3, 1934).

Recording Potential Inguinal Hernias

By R. D. Mudd, M.D.

With the increase in knowledge of compensation laws in the various states, it has become quite imperative for employers to have their employees examined physically prior to employment and at various intervals during employment.

One of the most important features of the physical examination for employment is the determination of the presence or absence of hernia. By far the most prevalent and, therefore, important hernia is the indirect inguinal. This is the one, too, that causes the greatest amount of legal controversy. Thus, as a matter of record, a description, as accurate as is possible, should be made of the condition of the external inguinal ring and of the local response to cough.

For some time I have attempted to describe the condition present at the external inguinal ring, in the following way:

I rate the size of the external ring from "0" to "four," an "0" ring being one too small to admit the tip of the index finger; a "one" ring being large enough to admit just the tip of the index finger; and a "four" ring, large enough to admit the tips of the first, second and third fingers when held together. Intervening sizes, i.e., between "one" and "four," are rated "two" and "three."

The response to cough is similarly rated, i.e., from "0" to "four," an "0" response indicating no perceptible impulse, a "one" response being one in which an impulse is barely felt, and a "four" response being one in which a definite sac is felt to descend to the level of the external ring during cough. Intervening responses are listed as "two" and "three." Responses number "two," "three" and "four" can quite definitely be classed as indicating bubonoceles, whereas I consider a "one" response as doubtful. This method simplifies the description of bubonoceles and potential hernia. The condition present at each external ring is recorded by using two numbers, the first referring to size of ring, the second to response to cough. This "13" means a "one" size and a "three" response to cough, and "20" means a "two" size and no perceptible response to cough. A "44" would indicate a very large ring and a sac felt at the external ring on cough.

My practice is to record the right side first, writing four figures to indicate the condition present at both external rings. Thus "1023" indicates a "one" size on the right with no response to cough and a "two" size on the left with a "three" response. When the two external rings are judged to be similar, I replace two of the figures with the letter "B"; thus "B31" would mean a "three" size and a "one" cough response on both sides.

The advantages of this method are:

1. It saves time, especially where large numbers of employees are to be examined;
2. It avoids a great many embarrassing questions by employees; and
3. It definitely records the condition present at the external rings and in the medial half (at least) of the inguinal canal, and later assists in determining, in the examiner's mind at least, whether or not "aggravation" of bubonocele or incomplete hernia has occurred.

It is admitted that the personal equation will vary greatly in the use of this method, but I have found it convenient from all three of the angles mentioned above.

Dust Hazard in Mines and Allied Industries

An initial survey of the extent and severity of the health hazard due to dust in mines and allied industries includes activities in connection with metal mining, coal mining, smelting and refining (both ferrous and non-ferrous) and the manufacture of cement.

There is no reason to think that human ingenuity and care will not develop methods of prevention or removal, even as it has done in aerial and gas warfare.

It seems a fair guess that, as metals and minerals become scarcer, the comminution of lower grade ores and rocks, largely siliceous, will increase the quantity of dust produced, since about 60% of the earth's crust is composed of silica. It is evident that humanity has been exposed in some degree to the dust hazard for some little time, and that it probably has developed a certain constitutional immunity through the ages that will carry it past this hazard.—*Contribution No. 45, American Inst. of Min. and Metal. Eng.* (August, 1933)—*Abstr. A.J.P.H.* (October, 1933).

Workmen's Compensation

—A Complete Study of the Subject with Special Reference to its Medicolegal Aspects—

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XIV. Accident Causes

AN ACCIDENT in its broadest sense is the unforeseen happening of some event. A chance occurrence, as it were. Obviously the occurrence or happening is, in a sense, beyond human power to control. Accidents, therefore, are rather infrequent.

Injuries to persons and damage to property are more often the result of thoughtlessness or carelessness. They involve a mental background, but often they are remote causes of the result which obtains. I recall a very serious and disastrous explosion which occurred in our plant some years ago. A gas furnace had been shut off. For some reason the jets had been opened without being ignited. The lighter's attention was drawn away for a few moments. He returned with a torch and the explosion followed. The details were never learned from the lighter. It was supposed, inasmuch as he was always a reliable employee and knew the dangers, that he attempted first to turn off the jets, but that the gas, having been flowing, caused a mixture which was ignited by the torch—something that would not have happened under ordinary conditions. Thus the original turning on of the jets did not cause the explosion, nor did the failure to turn them off. It was when the torch was brought that the explosion occurred. There was, in this instance, damage to property and loss of human life.

Almost every occurrence resulting in harm to person or property comes within the causes as classified, mental, physical, or both acting concurrently. But, in the meaning as it is usually applied, it is an accident.

Accidents happen to machinery, such as the breaking of a fly wheel or an emery wheel, crystalized castings, slipping of belts, chemical explosions, electrical phenomena, frozen bearings, and all manner of things of physical origin. It may often be that the fault lies in the failure of a human being to act properly. Damage to machinery, however, without harming a human being, does not concern us as a part of the subject of Workmen's Compensation.

We are more interested in those events which involve human life and activity; such events may be classed under the large heading of unavoidable accidents.

The unavoidable accidents constitute, by far, the smaller number of accidents. They are practically all included in those accidents known as acts of God, or *vis major;* they are such events as storms, floods, lightning, earthquakes, volcanic eruptions, droughts, or any occurrence over which the human element has no control. Although the event itself may not be foreseen, once it has begun there are often opportunities to lessen damage by timely human interference; but where this human interference is carelessly or thoughtlessly performed, resulting in injury or damage, the act of God cannot be said to be the proximate cause.

The element of causative factor is sometimes drawn by lines of fine distinction. What is proximate and what remote may often be a question of fact for a jury to decide. After all, the general rule of negligence applies, and depends upon what a reasonably prudent man would do under the same or similar circumstances. This is the universal rule.

Avoidable accidents are, on the other hand, those which, by reasonable and timely thought and action, may be averted. To avert an accident, however, we must know what things and conditions are likely to cause accidents.

There are two definite, specific causes of avoidable accidents: mainly physical or mental, or a combination of the two.

(a) Collisions: Consider first physical causes. Although it is difficult to point out physical causes of human activity which do not, to a certain extent, involve a mental phase on the part of someone, they do occur. Collisions with objects in a poorly lighted place, or stumbling over objects in the dark, or what is known as "stubbing the toe," are examples. By collisions I mean striking the body against some object. Of course if the object is carelessly placed, someone is accountable. Puncture wounds by nails in boards on construction jobs are rather common. Most of these are avoidable, but few are minus the mental element of thoughtlessness or carelessness.

(b) Falls: Falls from scaffolds, in hatchways, from construction framework, or from any cause, are usually avoidable.

(c) Falling Bodies: Falling bodies which cause a large number of injuries add markedly to the casualty list. These are usually the result of someone's carelessness or thoughtlessness. And this is the fertile field of the safety engineer. But after all it is a matter of educating the workman. Any employer is only as safe as his most careless employee. For one careless employee can do more harm in one minute than all the safety men in the world can repair in a lifetime. Thus the question of safety is one of education and continued surveillance until the *habit of safety* is formed. The thought of consideration for fellow employees is the foundation of safety.

(d) Machinery: Machinery as a physical cause of accidents takes in a great deal of territory and is one of the chief offenders. Machinery has no brain and must be governed and controlled by human observation. A faulty machine should not be kept in operation; it should be promptly repaired. All parts likely to cause an injury should be guarded. Employees should be instructed to be just as keenly alert to these hazards as any foreman or superintendent. To be able to avert one minor accident may save a life.

Specific Causes---Mental

THE mental causes of accidents are principally haste, carelessness, fatigue and mental stress of all kinds. These are all problems individual to the workman. Mental stress may be founded in domestic, financial, or diverted attention, problems; these are often evident and easily seen if the observer is trained to find them. Foremen, at least, should have this qualification. This subject alone demands much study.

Mental conditions are the result of the general environment of the employee. They are seldom found as an inherent factor in the employment except in those employments that cause mental strain by reason of the attendant concentration and confinement.

XV. Industry

IN THE vast majority of instances when the term "industry" is used, it is accepted as meaning manufacturing. When applied in the sense of political economy it means the habitual employment of labor. Industry surely takes in the entire domain of human activity. The chapters covering the subjects of employer and employee include the varying phases of each, and the importance of the correlation of the separate interests.

What Industry Includes

AFTER all, any human being whose time is spent in gainful occupation is a part of the industrial life of the world. When we attempt to set up marked differences in the classification of human endeavor, we are inclined to separate the laborer from the mechanic, the machinist from the tool maker, the bricklayer from the carpenter, the contractor from the architect, the doctor from the lawyer, the minister from the evangelist, the novelist from the journalist, the editor from the cub reporter, the publisher from the author—in fact we make all manner of intermediate distinctions. You may choose what differences you may. The great distinction from time immemorial is that made between "capital" and "labor." Both are essentially the basic elements of industry, the foundation of our daily existence.

Capital and Labor

THE analysis of the employer and employee shows the accepted difference, the similarity, and the homogeneity. The employee becomes the employer, and the employer the employee. Just so are capital and labor accepted as separate entities, and yet I believe I can show that labor is capital and that capital is labor.

It is hardly necessary to enter into any lengthy discussion to prove this point, but as the story of industry unfolds, the differences and the sameness will surely be recognized. Capital is a something resembling a giant in industry. Labor, in proportion, may be described as a pigmy. This is not true. Capital is no stronger than labor, nor is labor any weaker than capital. They stand on a level. When either one becomes too heavy, the balance law of economics goes on the rocks. Let me make this clearer.

Labor was the first in time. There was, however, capital but it was, at first, an intangible thing. It amounted only to the available natural resources. It could not be made tangible until labor had converted it into property. Vast expanses of land, unowned and undeveloped, are potential capital; but it would be a difficult task to borrow money by putting up such land as security, for one would promptly say, "that has no value."

But suppose, by means of labor, this same land is converted to productivity, through agriculture or mining, or as a right of way; then a value at-

taches immediately. This is well illustrated in the mere staking of a mining claim. The prospector goes forth with his grub stake; proceeds into promising territory. (It may never be anything else but "promising"; on the other hand, it may.) Here he is a lone individual. He is, however, permitted to pursue his chosen vocation because he has capital. Now, what is his capital? First, his health, his physical energy and his hopefulness; second, his grub stake. These are his assets, his capital. He may make a strike, or he may not. But if he does not and his grub stake is absorbed, he is broke. If someone else has staked him, he is blessed with an additional burden, that of repaying the borrowed money.

In the Cripple Creek district, in 1906, the mountainsides were honeycombed with prospect holes. Dump after dump lay as mute evidence of sweated brows, shattered hopes, and lost labor. Man power wasted! When I think of this picture I sometimes wonder when we talk about lost time in industry how little it really means. This was not only lost time but lost energy as well. I await with interest the report of some able statistician along this line. How difficult this task would be, for the prospector knows nothing of the eight-hour working day, the shop whistle, or the time clock. His hours are from dawn till dusk; his hope is his stimulus; often his effort is his sole reward. This was true in '49, in California; it was true in the Klondike in '96 and '98 when a solid line of single file marchers trekked in search of gold. What a huge waste of individual man power. Yet a new and undiscovered country was opened up to industrial endeavor. It all helped to make the going easier for those who followed. The lust for gold is just as keen today, and will continue so—unless humanity is being deprived of its greatest asset, energy.

But in these waste territories, where hundreds of men went, rich strikes produced wealth—because gold represented value, and value is capital. In instances a lone miner was at one minute wretched and starving, in the next he had risen to the power of a capitalist; his patch of ground, barren and waste, at once became a gold mine. In such an instance the project furnished its own capital. But if he was to develop his project more rapidly he had to return to civilization and borrow money with which to purchase machinery and pay his workmen. He had to borrow from someone who had the money. This was liquid capital, but to get it he had to share the results of his labors with the man who had it. At this point we see a marked distinction between capital and labor, for if the money power is great enough it will overwhelm labor, and the real producer and discoverer of the mine may eventually get but a small proportion of that which his energies have produced. Yet we must not lose sight of the other side of the picture. Suppose that the lender of the capital saw only the prospects of development; was willing to chance his money with the labors of the prospector. But the lode turned out only small. Machinery and man power, capital, however, had been invested; the money was spent; it paid for equipment, machinery, transportation, supplies and energy. In the vernacular, it was a "bum steer." The capital, however, has not been wasted; it has only been transformed.

But if the mine had produced, and large quantities of gold had been taken out, then the lender profited far beyond the mere return of his investment, and the wealth of the world was increased.

The illustration may be carried on by showing the mine to be of unusual production, so much so that there seems no limit to its output. The gold continues to pour forth. More modern equipment is installed, less manpower is needed. The mine is producing, in value, a return on the investment far greater than was dreamed of. This gold that has been produced now has but a single value; that of security. It may be loaned, but it becomes labor, and as labor it should only expect to receive in wages what it earns.

Capital and Labor Adjustments

THE LAW has fixed its wages upon the theory of usury. But the usury law, like many other laws, does not always mean just what it says. Economists so often lose sight of these important meanings, and what is fundamentally intended to be just becomes unjust.

Upon this accepted principle rests the foundation for future prosperity and industrial progress. This thought is the proper foundation for the temple of industry. The whole scheme rests upon a previous statement in this work that labor is entitled to a fair return for the ability and energy expended. Human activity does not have a fixed value, but capital activity and energy should have. Wise and just legislation will solve this problem when it is properly understood.

XVI. Society

IN THE preceding chapter, there was an attempt made to present the real foundation thought as it applies to the term "industry."

The importance of the human equation was stressed. As has been observed, the human equation is the backbone of the principle of Workmen's Compensation. To round out the picture, this chapter is devoted to society and its relationship to industry, while the following chapter will discuss the question of government as it evolves from the interlocking activities of industry and society.

Society is the relationship of men associated in any way to one another. In human activity there is no such thing as individual independence, because man cannot exist alone. Even Robinson Crusoe had his man Friday. Every human being, from the moment the first breath of air has entered his lungs until the moment of the final expiration, is dependent upon someone or something. He is first dependent on livable air and if his wants could end there he could, in all probability, live indefinitely. But his wants do not end there, and his next demand is food. Then there is the preservation of bodily temperature. This also must be furnished,—either naturally or artificially. This dependence for food and bodily comfort continues until the child has grown able, by one means or another, to make his own living, in other words, until he is physically emancipated.

Now let us say, as an individual, he is capable of making his own way. May we say he is independent? By no means, for he must now look to that person who will furnish him the opportunity for a livelihood. That person, however, is not an individual. It is the combined mass of humanity — society; and from the time of his physical emancipation, regardless of age or station, he takes his place in society and is dependent upon society.

I had often as a boy, looked forward to the time when I could grow to be a man and become independent. This was only a childish illusion, but I have since become completely disillusioned. I am, however, astonished to hear fully matured individuals refer to someone as being independent or expressing a great desire to become independent. Just a mere thought will bring the thinker to his senses and confront him with the fact that there is no such thing as independence. Even as a group, we have learned at this day and age that even national independence is almost an impossible thing.

For the benefit of any who may question the sincerity of my words, especially those relating to financial independence, let me suggest a concrete example. Picture a millionaire on a desert waste, alone with his million in cash upon his person, with no possibility of communication. What would that million in money avail him? He could not so much as buy a drink of water, and should he perish and be covered with the sands of the desert, that million and he would be as though he never existed. Material possessions, therefore, are of no value except as they may serve society as a whole; and there is, then, no such thing as independence. It is, of course, true that there are varying degrees of dependency. The millionaire may not be dependent so far as purchasing potentiality is concerned, but without the production by society of those necessities which he must purchase, he would still be "out of luck."

So we come, then, to the conclusion that men are society, engaged in the common purpose of providing themselves and one another with the necessities and luxuries of existence. As conditions change throughout the civilized world, the importance of the relations of men one to another will become better understood.

The institution of Workmen's Compensation as a fundamental principle within this understanding, was first recognized by Germany as early as 1870. It was the response of government to the yet unborn demands of the governed, and was very successful in its purpose. It was the thought of statesmen who were farsighted enough to see what the future demands would be, before the governed were pressed with the necessity of making them. After all, this is true statesmanship.

In the United States on the contrary, the legislation was the result of popular demand, and in the early days of Workmen's Compensation in America, the principle was met by a great deal of opposition on the part of industrialists.

Society and Workmen's Compensation

I REMEMBER well the many debates which arose about compensation, and the ultimate legal controversies testing its constitutionality, but Germany was not required to await the outcome of lengthy legal squabbles. The principle was accepted as sound and was put into practice.

Although Workmen's Compensation has been in effect in some of the states since the early part of the twentieth century, society has not yet grasped its full import. It is interesting to note that while these thoughts are flowing, California is quibbling about the question of reimbursing a claimant for the loss sustained by damage to a wooden leg in an accident. A truck driver hav-

ing an artificial leg, fell from his truck, catching the artificial member in such a way that it was broken in the fall. Now the great minds of California, legal and otherwise, are engaged in a huge controversy, testing whether this wooden leg or any other wooden leg so involved and so damaged, shall be subject to compensation.

Were it not for the fact that these sundry and diverse statutes are clothed in verbiage that officials themselves do not understand, many claims would be allowed or disallowed without much hesitation. By the time this California truck driver finds out whether or not he can hope to get another leg at the expense of the state, he will have lost in wages many times the cost of it, to say nothing of the valuable time and legal talent devoted in pursuit and contest of his claim. Such instances are purely nonsensical.

The bickerings in the law are often disappointing, but the inconsistencies come about mainly because society does not understand its purpose or its workings. It seems strange that Industrial Commission cases should be brought into the courts for determination. If the law would be clearly stated and understood, there would be little occasion for the misapplication of its principles. As it stands now, cases are allowed which should be disallowed, while other, and just, claims are disallowed when they should be allowed.

The statement has been made that society should have a better understanding of the law. This is true. But how is society to get this knowledge if it is to be forced to rely upon volumes of statistical reports and inconsistent decisions? Society must be given a knowledge of the fundamental principles back of this law before it can have any idea of the application or misapplication of the principles. They are not complicated or difficult to understand. It is not a question involving higher mathematics or metaphysics; it is purely a question of common sense.

When the law was first passed in Ohio it was optional with the employer as to whether or not he cared to be covered by the state. Then when the compulsory clause was inserted, all employers, employing five or more workmen regularly in the same line of employment were made to come in. Later the act was amended to bring in all those employing three or more.

Who Pays the Premiums?

WHAT was the purpose of all this. The employer must pay his premium into the fund. This premium must be included in his operating costs. The operating costs must come out of the profit of his product. The product must be sold to society. Therefore, society pays the premium. Society may not know it, but it pays the premium just the same. Regardless of where the product of the employer is sold, that purchaser helps to pay the premium into the Workmen's Compensation fund. What greater or more forceful argument could be presented in favor of a uniform Workmen's Compensation Act? We have a uniform Negotiable Instruments Act, a uniform Sales Act, a uniform Stock Transfer Act, a uniform Bills of Lading Act. None of these are of any greater commercial importance than a Workmen's Compensation Act.

Now that we know who pays the premiums, let us see who gets the benefits. Primarily, the injured workman or his dependents, but the employer is freed from unnecessary annoyance in the settlement of claims (sometimes) and the burden of providing for public charges is surely lessened. So after all, society pays the bill and society gets this benefit. This surely is equitable.

Suggestions for Improvement

IN AS MUCH as this is true, it follows that every employee should be covered by Workmen's Compensation, and that the setting of an arbitrary figure for the number of employees is basically wrong.

The question often arises, "Was the injured a regular employee? Some jurisdictions make a distinction as to casual employees. Of course this is only a bone to fight over. If every employer were obliged to cover every employee, there would be no such thing as a casual employee.

Then, too, the question arises, "Did the injury arise out of and in the course of employment?" As to an actual injury, this should not be a difficult question, for it could easily be answered by another question: "Was the injured person being paid a wage or a salary for the work he was doing at the time the injury was sustained?" If he was, the premium should have been paid into the fund on the basis of this wage.

Great annoyance and uncertain findings result in cases which develop symptoms long after an alleged injury. This difficulty could be corrected in most instances by setting a fixed time for reporting the accident, and, if not reported within that time, the claim should be outlawed. This is based upon the simple theory of the Statute of Limitations.

The suggestions are only indicative of the possibility of simplifying the entire act. One more common ailment, that is, as to who the employer

was at the time of injury. This is a favorite fight where an employee is shifted from one boss to another, bringing up the question of independent contractor. This could be easily disposed of by providing that whoever pays the wage shall be considered the employer.

Another favorite question is the coverage of employees in interstate commerce. This question basically should not be a difficult one. Every person, to establish certain rights, is required to set up a residence or adopt a domicile. Therefore, the law of the domicile should govern. For example, an employee whose residence is in one state should be covered by the compensation act of that state regardless of where he might sustain his injury, provided, of course, that his employer does business in the state of the employee's domicile. And inasmuch as his employer is engaged in interstate commerce, it should be considered that he is doing business within the state since his employee resides in a given state, for he has entered into a contract of employment with that particular resident. Such an arrangement would also simplify claims of dependents.

We all realize how difficult it is to get the mind of society, or what we usually call public opinion, to crystalize. This public opinion is a peculiar something in our body politic that may cause certain reactions on the part of public officers. But usually the response is that activated by the desire to be re-elected more than the desire to serve the public while fulfilling the office.

Lest we be accused of becoming too idealistic, I would like to suggest that the following thoughts are submitted more in hopefulness that a better understanding of society's relation to the Workmen's Compensation theory will be evolved, than an expectation that they will be accepted in their entirety. But since this chapter is devoted to society, why should we not be permitted to disclose a few pertinent ideas.

I have often stated that our present day conditions have lead us too far away from our real obligations to the younger generation, particularly that we make youth wholly dependent too long and thus prevent the acceptance of responsibility early in life. I am not advocating the indiscriminate exploitation of child labor, but the very fact that a youngster sells newspapers is one of the best arguments for the early building of responsibility. There is no calling at which a yonngster can better learn the importance of service and responsibility. He practically engages in a business of his own very early in life. Other positions such as errand boys, minor clerical positions and such should be encouraged. I have noted several cases where the parents actually prevented the youngster from attempting any pursuit. In some instances these youngsters have grown to maturity and still are unable to earn a living.

Classification of Workers

WORKERS have been classified as to occupation, and premuims are based upon various kinds of employment. This is very good so far as it goes, but a human being rises from youth to maturity and from maturity to old age. The actual time of application to the pursuit of a gainful occupation is at best limited. As the system now stands, the classifications of employment are, for the most part, based on hazard. But it seems to me that a much better classification would be to base them upon age, for the reason that age is important as to the maintaining of vitality and the ability to react to injury. This is physiological.

It has already been suggested that every employer be required to cover every employee. This, of course, would add materially to the fund and at the same time have a tendency to lessen premium rates in general. Thus the small employer would share the burden equally with the large employer, for after all, as has been observed, society in the final analysis pays the premium. It simply amounts to a more equitable distribution.

Accordingly, the suggestion is ventured that premiums be fixed upon the basis of an age classification. We will analyze this and see how it would work out, theoretically, at least.

First, it should be provided that no child under 10 years of age be employed by anyone for a wage. From 10 years up to the age of maturity, whatever age might be set by the state, the premium could be graduated as to age, regardless of the character of the employment. It should be mentioned here, although it will be discussed later, that the awards should also be dependent upon the age at which the injury is sustained, taking into consideration, of course, the extent of disablement. Also the premium should be adjusted to payroll and the award adjusted to wage.

The period of greatest activity in a gainful occupation is between the ages of maturity and 55 years. It is also the period of greatest hazard. Within this limit the classification of employment could be made more simple in the following manner: Office—executive, administrative and clerks; Factory—machine hands and non-ma-

chine hands, including maintenance; Outside employment—salesmen and delivery; Construction—skilled and unskilled labor. If employed after 55 the same classification could be applied but under a higher premium rate.

Under this plan, however, we are including all employments in a gainful occupation. With the proper working out of such an arrangement, the premium fund should be sufficient to permit the average workman to retire, if he so desires, at the age of 55, under an old age pension to which he would be entitled at his option.

Old Age and Widows' Pensions

IT MUST be immediately observed that a proper pension plan would remove from industry, the majority of employees at an age where they are practically free from the burden of rearing families and their places would be filled by younger men as they follow. This phase alone would not only be a social step forward, but it would also relieve industry of an age hazard. The great social advantage would also be that this consuming class would add to the value of the service of the producing class.

The provision for a dependent widow of a pensioner would also be included, thus relieving such dependency and lessening the financial cares of age and the number of public wards.

No doubt objections will be quickly raised and the cry of socialism heard, but have we not already opened the door by the adoption of Workmen's Compensation? We should, therefore, make every effort to perfect it or abrogate the entire plan.

Arsenic Poisoning in a Manganese Factory

DR. SALMON and Dr. Planque (*Ann. d'hyg. pub. indust. et sociale*, April, 1933) have lately described an outbreak of arsenic poisoning in a factory which, in December, 1929, began to crush and dry salts of manganese. In October, 1932, some of the employees were found to be suffering from such symptoms as pain in various parts of the body, difficulty in walking (particularly downstairs), stuttered speech, and mask face. The extensors of the legs were slightly atrophied and a steppage gait present. In none of the four cases were there cutaneous manifestations, a positive Wassermann, cyanosis of the extremities, or hyperkeratosis of the palms of the hands or soles of the feet. In diagnosis, lethargic encephalitis and disseminated sclerosis had also to be considered.

Inspection of the factory showed the workers looked like "blackamoors," so thick was the manganese dust on them. They were all indoor workers. However, one of the most exposed to the dust had shown no signs of poisoning. Also those who worked outdoors were free of symptoms. "An analysis of the powder handled in the factory showed it to contain over 81% of the oxides of manganese, and over 9% of silica. It also contained 0.013% of arsenic." — *Lancet* (June 17, 1933)—*Abstr. A.J.P.H.* (Sept. 1933).

Benzol Poisoning

EMILE-WEIL states that the increased use of benzol in industries has resulted in an increase of benzol poisoning. Benzol intoxication from inhalation of benzol vapors most frequently results in injury to the blood and the hematopoietic organs. The injury may cause not only hypoplasias of the erythrocytic or leukocytic system but hyperplasias of the leukocytic system as well. The anemias produced by benzol vary from latent or light forms to severe cases of pernicious anemia. The author thinks that the hemorrhagic tendency which often accompanies the light anemias of benzol intoxication possibly contributes to the production of the anemia, and that, at all events, it is a prodromal sign of a syndrome of a grave anemia with purpura hemorrhagica, which is best called aleukemia hemorrhagica. This is the most common form of severe benzol intoxication. It presents no differences from the hemorrhagic purpura caused by gold salts or arsphenamine. Death occurs within a few days in severe cases; when poisoning is less severe, slow recovery may occur. Benzol poisoning may have a very early effect on the leukocytes. Persons in apparent good health having no clinical signs of anemia, may have a slight leukopenia, and cases have been reported presenting a light anemia and a sever leukopenia, but no true agranulocytic syndrome has been described as yet. The occurrence of hyperplasias as a result of benzol intoxication is rare, but both acute and chronic cases of leukemia have been reported. Lignac was able to produce some cases of leukemia and some of lymphosarcoma in mice by administration of benzol. This contradictory effect of benzol does not seem so strange in view of the fact that roentgen rays may produce either aplasias or hyperplasias of the blood and hematopoietic organs.—*Paris Medical* (August 5, 1933)—*Abstr. J.A.M.A.* (October 14, 1933).

Our Problem Page

—VIII. Lead Poisoning—

THIS is the eighth of a series of articles in which important problems of industrial medicine and hygiene will be discussed. In the form to be used, the problem in its essentials will be briefly stated, and the discussion will follow. Suggestions from readers will be welcomed and given due consideration in the selection of future subjects.

PROBLEM: There has been some disagreement as to the various points in the diagnosis of lead poisoning. Please mention the important points and discuss them.

DISCUSSION: This discussion, as has been suggested, will be limited to the diagnosis of lead poisoning. It is correctly stated that there has been a wide divergence of opinion regarding the importance of certain diagnostic procedures and also the interpretation of them. A number of these will be mentioned and discussed.

Non-Industrial Sources of Lead

ONE of the chief difficulties besetting the physician who would make a proper diagnosis of lead poisoning, is the many non-industrial sources of lead which must be differentiated and borne in mind when making a diagnosis of industrial lead poisoning.

Although not so much encountered in the middle west, in the east one of the non-industrial sources of lead is that found in domestic water supplies which are conducted through lead pipes. In the study of such water supplies, in 1923, Wright, Sappington and Rantoul discovered that, of a group of 253 persons examined, approximately 25% had developed lead poisoning from this source. (*Journal of Industrial Hygiene*, X: 234-252, September, 1928.)

Another non-industrial source of lead was discovered in the industrial clinic of the Massachusetts General Hospital, where it was found that almost 11% of cases of lead poisoning studied over a period of a number of years (1911-1923) were associated with the consumption of home-distilled alcohol, wines, or other types of liquors. In some instances the amount of lead per liter of fluid ran as high as 75 milligrams.

A considerable amount of research work has been done recently by Kehoe, showing that certain common articles of food, such as bread, cereals, ground meats, canned meats, ice cream, certain kinds of vegetables and fruits contain not only traces of lead but appreciable amounts. There is an excellent bibliography attached to several articles in the *Journal of Industrial Hygiene* for September, 1933, setting forth the research on this subject. Because of the many types of non-industrial sources of lead, and because of the possibility of any worker who is exposed to industrial lead also taking lead into his body from non-industrial sources, it becomes necessary to estimate the amount of lead in the air of the industrial environment, if any estimation of the lead hazard in industry is to be properly made. Methods are now available for doing this type of work and should be used in every instance where there is any possibility of an industrial exposure. It is only through the measurement of lead in the industrial environment that a proper and adequate measure and identification of the industrial exposure can be gained.

Diagnostic Criteria

IN BULLETIN 116 published in 1921 by the U. S. Public Health Service, there is set forth a group of symptoms by which one can be aided in making the diagnosis of lead poisoning. This work was done with reference to a survey on pottery workers. Although the entire list of symptoms and the discussion need not be repeated here, a summary of the important findings is as follows:

General appearance—marked pallor and profound anemia.

Digestive system—Colic—obstinate constipation.

Muscular system—muscular incoordination.

Nervous system—peripheral motor paralysis of certain extensor muscles (wrist and ankle drop) and atrophy of most used sets of muscles.

Vascular system—basophilic degeneration of red cells with diminished hemoglobin.

Special organs and findings—lead line on the gums—stools and urine positive for lead—repeated miscarriages — a positive Liebermann's test.

It is stated that lead poisoning may be diagnosed by proof of definite exposure and the presence of at least two of the symptom groups

above named. It is important to know, however, that recent investigations have disclosed the presence of lead in the urine of individuals not industrially exposed, in quantities which are sometimes equal to those found in persons with industrial exposure. It is doubtful, therefore, that a urinalysis for lead in exposed industrial employees is of value as a diagnostic procedure. Bearing in mind the sources of non-industrial lead, it would also be doubtful as to whether such a test would be worth while.

With reference to the study cited, relating to the contracting of lead poisoning through lead-conducted water supplies, it was discovered that findings occurred in greatest frequency in the following orders: stippled red cells; pallor; headache; eructations; hemoglobin less than 70%; constitpation; lead line on the gums; abdominal pain; joint pains; and weakness of forearm muscles.

Objective Tests

IN THE diagnosis of lead poisoning we have a real need for the development of objective tests which can be considered scientifically sound and adequate. The reason for this is apparent—the symptomatology of lead poisoning is liable frequently to cause difficulty in differential diagnosis, because of the simulation of symptoms which are very common in ordinary disorders.

It will probably be of some assistance to discuss the various objective procedures, the technique involved and the interpretation of them.

The lead line, as proved by the researches of Aub and his co-workers, is a subepithelial granular deposit of lead sulphide in the gums, which cannot be rubbed off in a way similar to the rubbing off of tartar deposits. The lead line occurs around the margin of the gum adjacent to the cervix of the teeth and is quite likely to be found near the lateral incisors. The usual method of teaching formerly in regard to the observance of the lead line was to examine the gums with the naked eye and, if a blue line was seen, it was interpreted as a lead line. This technique, however, is not that which has been adopted by a number of investigators, which is as follows: the lower lip should be held down with a clean piece of cotton and an ordinary hand lens (usually a biological tripod lens is as efficient as any) is held before the margin of the gum, and if the lead line is present it can be observed as a chain of black granules very similar to a chain of streptococci under the microscope. If a lead line is present it means that lead has been absorbed by the body—it may not indicate lead poisoning. The absence of the lead line is not significant—lead poisoning may be present without a lead line being observed.

A second important objective test is the occurrence of basophilic degeneration of the red blood cells. In the literature, one finds as many different types of staining technique as there are research workers. One of the common forms of staining, which has been widely used, is known as the McCord method, which makes use of Manson's methylene blue and by which method the red blood cells are laked, the basophilic material appearing as aggregations. More recently, however, Jones, in the *Public Health Reports* for August 18, 1933, has described a technique for the estimation of basophilic cells from ordinary blood films. This investigator tried out a variety of staining reactions and found that the best results were obtained by what is known as the Sussmann-Weindel solution of toluidine blue, methylene blue, and borax. The advantage of this solution is that it furnishes the best results, both in fixed and non-fixed films. Another advantage of Jones' modification is that one-half of the slide can be fixed by methyl alcohol and the other air-dried, so that the contour of the red blood cells may be studied in the alcohol fixed portion and the basophilic aggregations in the air-dried fixation portion. A comparison of this method with vital staining shows that it gives excellent results and that the percentage of erythrocytes with reticulations is the same in both methods. The occurrence of basophilic aggregations or reticulocytes while not pathognomonic of lead poisoning is indicative of the formation of new cell forms which do occur in lead poisoning; coupled with proof of exposure it is a valuable diagnostic test.

Another relatively new objective test was that which was performed on cases of lead poisoning discovered in a study made concerning the burning of battery casings by Williams and his coworkers, in Baltimore, printed in *J. A. M. A.*, May 13, 1933, Vol. 100, pp. 1485-1489. In this study, use was made of the spectroscope which showed a presence of lead in blood samples.

Summary

THE diagnosis of lead poisoning is not as simple as it may appear. At the present time, the following points are important in the order stated: (1) proof of adequate industrial exposure, by quantitative estimation of the amount of lead in the industrial environment, through

the taking of air samples and analysis; (2) objective tests of various kinds; and (3) clinical symptoms.

Head Injuries

ALL HEAD injuries should be considered as serious until proved otherwise.

The patient should never be rushed to the x-ray room immediately upon admission to the hospital to see if one can demonstrate the presence or absence of a fracture.

The first consideration should be the treatment of shock. Further measures should not be carried out until the patient has reacted from the stage of shock.

Depressed, comminuted and compound skull fractures should be operated upon, not for the purpose of treating the fracture, but in order to prevent intracranial infection.

Conservative treatment is indicated in the treatment in increased intracranial pressure, by means of hypertonic solutions, preferably 50% glucose.

Surgical treatment for increased intracranial pressure is indicated only in those cases presenting local pressure manifestations. — Dr. E. R. Arn, *Ohio State Medical Journal.*

Acute Benzine Poisoning

SCHNEIDER observed a youth, aged 17, who, while lifting a hose filled with benzine, got a gush of it into his mouth and probably swallowed some of it. He immediately felt pains in the chest and became dizzy. The gastric contents, when pumped out two hours later, had no benzine odor. The pains in the chest increased, particularly on the right side, and severe palpitation of the heart set in. The following morning the pains were so severe that he could hardly breath, and he was hospitalized. On the right side, beginning with the fifth rib, there was decreased resonance and the respiration was weakened. Examination of the urine revealed albuminuria, increased urobilinogen and cylindruria. The hemogram disclosed a leukocytosis, and the author believes that this as well as the fever were secondary changes and the result of the pulmonary symptoms. The thoracic pains and the pulmonary symptoms were most likely caused by a hemorrhagic focus near the diaphragm and by an involvement of the bronchus. The hemorrhagic character is asumed on the basis of observations in other cases. It is likely that the fright from the sudden gush caused the aspiration of some of the fluid benzine. The patient recovered within a month. The favorable course and rapid recovery indicate that the patient absorbed only a small quantity of benzine, and for this reason the suddenness and the severity of the pulmonary symptoms are the more surprising. The author thinks that the fact that the accident happened shortly after the patient had eaten a heavy meal and the tendency of benzine to combine with fats were important factors in this case, for it has been shown in animal experiments that an increased fat content of the blood makes for a greater susceptibility to benzine.—*Medizinische Klinik* (Berlin) (August 25, 1933)—*Abstr. J.A.M.A.* (October 28, 1933).

Carbon Monoxide

THE DISCOVERY of unexpected sources of carbon monoxide is frequently associated with tragedy. Recently the deadly gas appeared in a most unusual place when fumes from the engine exhaust of a gasoline launch entered a diver's air hose. Only quick thinking and prompt action on the diver's part saved him.

The diver was to examine several submarine high tension cables lying in the bed of a river. To provide a working base for these operations, a barge carrying the diver's pump and equipment was anchored in the stream. The force of the flowing water was causing the two anchors to drag. To lighten the pull on the anchors and hold the barge stationary a gasoline launch was fastened to it on the side opposite the diving operations. The launch was headed upstream and its power directed to counteract the drag on the barge.

Shortly after the launch was tied to the barge, the diver at work on the river bottom noticed a strange quality in the air supplied him from the pump. He signaled his attendant and was immediately hauled to the surface. An investigation showed that a current of air was blowing the exhaust gases from the launch engine across the deck of the barge to the intake of his pump, a distance of 20 feet.

The diver who occupied a supervisory position in addition to his diving duties had been trained in first aid and resuscitation.

The significance of this occurrence lies in its unusual nature. It emphasizes the necessity for thorough investigation of all unusual situations as well as continued precautions against the more familiar hazards.—*National Safety News.*

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"*THE PROBLEMS presented to the industrial physician by the morbidity and mortality resulting from cardiovascular disease are more complicated than are those presented to the physician in private practice. The industrial physician has medico-legal problems arising from claims that trauma, hard labor, or conditions in certain trades or industries have caused sudden fatal cardiovascular accidents or the onset of heart failure. He must determine the advisability and safety of employing or continuing at work the individual with arterial or cardiac disease, and in making such decision must consider not only the individual but also his coworkers and often the safety of those served by the industry.*"—Dr. Nathan Smith Davis III.

EDITORIAL

Sericite As a Cause of Silicosis

SINCE the publication of an article by Jones* in August, 1933, in which he places the responsibility for the causation of silicosis on a mineral known as sericite (hydrated silicate of aluminum and potassium) rather than on the quartz content of inhaled dust which is generally regarded as the principal causative factor, there has been considerable discussion as to the validity of Jones' claims.

*Jones, Wm. R.: Silicotic Lungs—The Minerals They Contain. *Journal of Hygiene*, London, Vol. 33, No. 3, August, 1933.

This study was done through the Geological Department of the Royal School of Mines of London, and described investigations of mineral residues from 29 lungs of persons whose death had been certified as due to silicosis. Five specimens of lungs were from workmen in the pottery industry and 21 were from employees of coal mines. The investigator discovered that the dust in all cases consisted of minute acicular fibers of sericite (which is also called secondary or white mica), and that the mineral was also abundant in all the rocks and materials that gave rise to the dust inhaled. Examination also disclosed that quartz existed in much smaller quantity than sericite in these instances. The conclusion was that uncombined silica or quartz was not the chief cause of silicosis but that fibrous minerals, chiefly sericite, during various operations of drilling, blasting or crushing were set free as individual fibers in the atmosphere and inhaled in sufficient quantities to cause silicosis. Whether these fibers acted by mechanical irritation or induced chemical changes was a pathologic question not decided by the author in this instance.

No published comment refuting or confirming this claim has yet appeared, so far as is known. However, a number of opportunities have occurred in this country, where it was found possible to examine samples of dust or sericite fibers.

One of these instances occurred in West Virginia where a great deal of drilling was being done through siliceous rock; samples of this material were sent to the Geological Department at Washington, D. C., for petrographic examination. It is understood that these examinations did not show an appreciable amount of sericite material, although it was definitely known that silicosis occurred by exposure to this type of dust.

In a recent report issued by the Commonwealth of Massachusetts, relative to the findings of the Special Industrial Disease Commission, mention is also made of the examination of samples of dust referring to different types of granite and also to foundry dusts. In certain of the petrographic examinations, sericite was not found, while in others it was found in very small quantities, and in additional samples the amount was appreciable. Although no general conclusion was reached, it was the belief of the petrographers that "in industry serecite can be avoided more easily than quartz."

Still more recently a debate on silicosis has been reported from the regular London Correspondent's letter to the American Medical Asso-

ciation (*J. A. M. A.* 102:1097, March 31, 1934). In this debate Prof. J. S. Haldane did not agree with Dr. Jones. It was the belief of Haldane that there was clear evidence which incriminated quartz, and the danger of crushing pure quartz without precaution against the inhaling of dust had long been known. Being a physiologist, Haldane protested against the idea that the lungs might be regarded as a sort of geological dust trap; by means of phagocytic and ciliary action dust was continuously removed from every part of the lungs, but in the case of pure silica this process failed to function and at the same time the lungs became susceptible to tuberculous infection. This view was supported by other speakers. Sir John Flett, director of geological survey, himself a physician, considered finely divided free silica a highly dangerous substance. This matter, then, awaits further research which will either confirm or refute the views of Jones regarding the action of sericite on the lungs, when breathed in the form of dust. Until properly planned and prosecuted research can be accomplished, this point of view remains as a theory.

Gas Hazards

THE STUDY of gas hazards in sewers and sewage-treatment plants is a subject on which there has been little scientific information.

According to Dr. R. R. Sayers*, gas hazards in sewers and sewage-treatment plants are those due to inflammable and poisonous gases and to oxygen deficiency. In general inflammable and poisonous gases may be derived from three sources: low volatile liquids which enter as a part of the sewage, leakage from gas mains into the sewers, or the products of fermentation or digestion of sewage.

The inflammable or poisonous gases usually found in sewage-treatment plants are methane, hydrogen, carbon dioxide, and possibly carbon monoxide and hydrogen sulphide.

The poisonous and explosive gases found in manholes are ammonia, benzol, carbon dioxide, carbon monoxide, ethane, gasoline, hydrogen, hydrogen sulphide, methane, sulphur dioxide, and certain unsaturated hydrocarbons.

Of especial importance are the precautions to be taken before entering manholes. According to the National Electric Safety Code, a workman should assure himself that the manhole is free from dangerous gases by testing with an approved safety lamp, by ventilation, or by some other adequate method. Tests may be made to determine the presence of poisonous or explosive gases by the use of various types of portable apparatus now obtainable. Odors are important indicators as to the presence of many such gases; but since some of them have no odor, such as carbon monoxide and hydrogen, other tests must be relied upon. Inflammable gases may be detected by various indicators and apparatus which are now available.

If, however, poisonous effects occur by contact with noxious gases in sewers and treatment plants, the victim should be removed to the fresh air as soon as possible and artificial respiration immediately instituted, according to the Schafer Prone Pressure Method, this being kept up until natural breathing is resumed. The other principles of accessory aid to the Schafer Prone Pressure Method should also be observed, such as assisting the circulation by gentle massage and heat, the avoidance of any exertion and the use of an approved type of inhalator in the cases where it is indicated.

*Sayers, R. R.: Gas Hazards in Sewers and Sewage-Treatment Plants. Sixth Annual Report, Ohio Conference on Sewage Treatment, State Department of Health, Columbus, Ohio, October 13-14, 1932, pp. 11-20.

A Study of Mortality in Exposure to Silica Dust

THE difficulties of establishing any definite relationship concerning mortality from exposure to free silica dust are numerous. It is essential, however, that some idea regarding the basic mortality from such exposure be approached, and that the truth, in so far as possible, be established.

Collis and Yule* have studied the comparative mortality of an occupational group exposed to silica dust with two other groups, the general population, and an occupational group exposed to dust not containing silica. These data were naturally based upon British experience, but afford at least interesting material for comparative purposes in this country.

These investigators found that of the 23 causes or what are known as cause-groups studied, only three (diabetes, appendicitis, and other diseases of the digestive system) show a mortality not significantly different from that of the standard

*Collis, Edgar L. and Yule, G. Udny: The Mortality Experience of an Occupational Group Exposed to Silica Dust, Compared with That of the General Population and an Occupational Group Exposed to Dust Not Containing Silica. *Journal of Industrial Hygiene* XV: 395-417, November, 1933

population. In the other instances without exception mortality in the silica group stands more or less above that of the general population. The highest mortalities noted were those due to respiratory tuberculosis, other tuberculosis, chronic rheumatism, and other such affections, bronchitis, chronic interstitial pneumonia, other diseases of the respiratory system, and hernia. Although pneumonia shows an excess mortality, it is not as high as the foregoing diseases.

Of considerable interest are the cases in which the cause of death is quite unrelated to the respiratory system. Of these, the ones showing excessive figures are cancer, cerebral hemorrhage, other diseases of the nervous system, valvular disease of the heart, arteriosclerosis, peptic ulcer, hernia, cirrhosis of the liver, and chronic nephritis.

Of course there is considerable difference in the incidence of these various diseases in the different age groups.

The investigators comment that every part of the body seems to be affected, the results of the inhalation of silica not being confined to the respiratory system alone, but affecting the circulatory system, the nervous system, the excretory organs, and the digestive system. It is further stated that such observations can be accounted for and it can be definitely accepted that silica escapes from the lungs by the blood stream and exercises its poisonous influence on the other organs.

According to these investigators, after analyzing and comparing the mortality records of the three different groups, they believe that silica is a poison similar to lead, and although it exerts its primary injurious influence on the lungs, especially with regard to the production of tuberculosis (gaining access to the respiratory system) it also impairs the circulatory system, the nervous system, the digestive organs, the large excretory glands with the effect that diseases of these systems and organs occur with more than ordinary frequency in those exposed to the inhalation of silica dust.

If such a view is tenable according to American experience, it will demand increasing care in the differential diagnosis of silicosis, as compared with some of the commoner forms of non-industrial diseases. This will involve examinations of greater scientific accuracy, coupled with an increasing amount of clinical laboratory work, not to mention a great deal more intellectual accuracy and discrimination, if intelligent results are to be attained.

Effect of Bituminous Coal Dust

BECAUSE the belief has been quite general that the inhalation of coal dust protects against the development of pulmonary tubeculosis, Gardner, Cummings and Dowd* conducted an experimental research on guinea pigs, causing the animals to be exposed to coal dust in the cleaning plant of a bituminous coal mine in West Virginia.

The concentration of dust in this instance average 84 million particles under 10 microns in diameter per cubic foot of air, the petrographic and chemical analyses showing 17.98% volatile matter, 73.83% fixed carbon and 8.19% ash; there was 3% organic material and 1.5% free silica. Five groups of experimental animals were inoculated at various periods of time with different strains of tubercle bacilli. Autopsy examinations were made on those animals who did not survive; serial rentogenograms of the chest were taken in certain instances; and at certain periods of time surviving animals were killed and examined. The conclusions reached by these research workers confirmed similar previous experiments; insignificant amounts of soft coal seemed to penetrate the lungs when compared with quartz dust and the proliferation of fibroblasts which occurs to only an insignificant degree has never been accompanied by hyaline changes which are characteristic of the response of pulmonary tissue to free silica. It is stated that the general nature of the reaction in these instances has been in every way comparable to that in the human lung. In regard to the effect of bituminous coal dust upon tuberculous infection, the results seem to indicate that the inhalation of coal dust does not cause such an infection to become progressive. In addition to this result the experiments suggest that there may be some protective action afforded by the inhalation of bituminous coal dust, against the development of a tuberculosis infection. It is proposed, therefore, to repeat certain parts of this work in an attempt to measure the protection thus afforded.

Such experimental research is extremely important at the present time, especially to industrial physicians and others who could apply such knowledge in a very practical way, to the many cases of alleged dust diseases of the lungs which are constantly arising among industrial workers.

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* Gardner, Leroy U., Cummings, Donald E., and Dowd, Gerald R.: Experimental Inhalation of Bituminous Coal Dust and Its Effects upon Primary Tuberculous Infection in Guinea Pigs. *Journal of Industrial Hygiene* XV: 456-465, November, 1933.

Industrial Medicine Digest

Medical Care in the Worker's Budget

C. RUFUS ROREM, Ph.D., C.P.A., Julius Rosenwald Fund, Chicago, at January meeting, Industrial Relations Association of Chicago:

—The economic hazard of sickness can be removed from the individual or his family only through group action; in other words, group budgeting is necessary if the worker is to place medical services in his family budget along with other necessities. This principle has been recognized and put into practice by employees in many lines of industry throughout the United States. For some years it has been customary for "company doctors" to be attached to the groups of employees working in mines, lumber camps or railroads. During the time when the doctor's services constituted the larger proportion of the cost of medical care, this arrangement proved satisfactory.

In establishments where the number of employees is too small for a separate group budgeting scheme, employees of similar occupations utilize their union or benefit associations to arrange for the group purchase of medical care. Usually the composition of the group has been limited to members in the same geographical area. In some metropolitan areas racial units have also served as the basis for group budgeting, medical benefits being provided through the local branches of the national group or of the fraternal order.

In some instances, medical care for the group of workers is financed entirely by the employer with all payments being made from the company treasury. Arrangements of this kind are in effect with the Endicott-Johnson Shoe Company, Binghampton, New York and the Homestake Mining Company at Lead, South Dakota. Many similar organizations exist throughout the United States.

In contrast to the financing of the service through the company treasury, many plans are supported primarily through fixed periodic payments by groups of individuals or employees. The employer may supplement the employees' contributions by various indirect benefits such as providing free use of building, paying part or all the salaries of the medical staff or procuring medical supplies and equipment for the group at exceedingly low prices. The essence of the group budgeting plan, however, is a contribution of funds by the potential beneficiary, the wage-earner or his family, who pays a fixed amount periodically. The contribution may be made at different time intervals. For example, the textile mill employees in Roanoke Rapids pay $.25 weekly. The members of the Electric Railway Employees' Benefit Association in Dallas, Texas, pay $1 monthly and the subscribers to a plan in Little Rock, Arkansas, pay quarterly amounts of $7.50 per person. The amount of the periodic contribution is influenced by scope of the medical services offered, by the inclusion or exclusion of family members and by the prevailing fees for medical services in the respective communities. For example, one general plan involves a monthly contribution of $1 for the services of medical practitioners and the use of their equipment only; in another case, $2 covers complete medical and hospital care to the family (with an additional $2 charge for each family member); in a third case, a $2 monthly payment provides complete medical and hospital care for the employees, but the care of physicians only for family members; in one other instance, $3 per month is charged each employee, single or married, for medical and hospital care for himself and his dependents.

The hospital bill is particularly hard to pay. Hospitals do not charge too much for their services; in fact, the board and room services in a hospital are lower than in a hotel. But hospital care requires absence from work or unexpected disruption of the household routine. Moreover, the unexpected hospital bill is accompanied by costs of other professional services, and may come at the end of a period of treatment which may have exhausted the family resources. In other words, the hospital bill is often the "last straw" in a load of financial burdens. For this reason many otherwise self-supporting people are forced to seek care in a tax-supported hospital at the time of a severe illness.

The plans for budgeting hospital service are known as "group hospitalization," and they apply to hospital bills only. They do not interfere with the services of the family doctor for simple illnesses, and they leave the subscriber free to choose his own physician or surgeon in case of injury or severe illness requiring hospital care. Subscribers to such plans usually are groups of persons rather than separate individuals. The groups may include the employees and families of a business firm or government department, or the members of a woman's club, professional association, labor union, trade association, or civic organization.

The plan was first tried out by 1500 school teachers in Dallas who subscribed for hospital service in one of the local institutions. Later, other groups asked for the privilege and arrangements were made. Each member pays regular monthly subscriptions which guarantee a certain amount of hospital care in case of necessity—usually a maximum of 21 days in one year.

A comprehensive plan of group hospitalization has been established by the 15,000 employees of the Goodyear Tire and Rubber Company. In other places, subscribers are enrolled from the general public. The cities in which group hospitalization plans have been organized by members of the public include Rockford, Illinois; Grinnell, Iowa; St. Paul, Minnesota; Sacramento, California; Dallas, Houston and San Antonio, Texas; New Orleans, Louisiana; Memphis, Tennessee; Charleston, West Virginia; Raleigh, North Carolina; Newark, New Jersey and Brattleboro, Vermont.

The annual cost of membership in the group hospitalization plans ranges from $5 to $12 per year per subscriber depending on the kind of room accommodations received, the types of sickness covered and the scope of services offered. Each subscriber pays the stated amount monthly into a central fund which is used to pay hospital bills according to the needs of individuals requiring hospital care.

A subscriber may be admitted to any of the hospitals when necessary, but only under the care of a private physician selected by himself. He must pay his own physician's fee, but he may receive without charge as much

as 21 days' free care in the hospital, including the use of a semi-private room, nursing service, meals, the operating room, x-ray services and laboratories. The hospital bill is paid from the central fund, which is administered by a non-profit corporation, with its own personnel for keeping records and explaining details to prospective subscribers. If the subscriber is an employed person or family breadwinner, he, of course, incurs a double expense in case of hospitalization, for he both loses his income and must pay the costs of hospital care. For this reason all the plans emphasize the enrollment of the wage earner. But it is important that the wife and family also enjoy protection against hospital costs. Several plans, therefore, have been established with special subscription rates for women and children. Others provide substantial discounts or designated hospital services to family members and dependents. A number of plans include maternity hospital service at greatly reduced rates to employed married women or to the wives of employees. In case a person who is not a member of an employed group wishes to join a group hospitalization plan, he or she may be permitted to share in the benefits by enrolling several other subscribers who make payments through him to the central fund. Small groups of this kind are usually required to make quarterly or semi-annual payments. A group of 20 professional men in Newark who belong to the same social club now include the group hospitalization payments in their annual dues.

In Chicago, as in other cities, nearly one third of all the persons hospitalized are admitted as "free cases" to the County Hospital and treated at the expense of the taxpayers and by doctors serving without pay. Many heads of families, even though employed regularly, would be unable at the time of severe unexpected illness to pay a hospital bill. They would be able, however, to subscribe small amounts per month if assured care in non-government hospitals of their choice where they can be attended by physicians of their choice.

The principle of group hospitalization has been officially endorsed by the national organization of hospitals in the United States, the American Hospital Association, which has recommended that member institutions cooperate with responsible groups of the general public who wish to apply group budgeting to hospital bills. The A. H. S. has established certain standards which group hospitalization should meet before being participated in by hospitals belonging to the Association. These standards should be considered by any group interested in group budgeting. The group budgeting plans should be established for the benefit of the subscribers and their families, not for certain hospitals or promoters. The sponsorship should be on a non-profit basis, and should not interfere with the subscriber's choice of physician or hospital at the time of illness. The plan should meet the legal requirements of the states in which organized, and be economically sound and efficiently managed.

Pneumoconiosis

DRS. GEORGE F. GRISINGER, T. R. BOLING, AND BERT BRADFORD, *in West Virginia Medical Journal* (October, 1933): — The authors report complete data and findings on what they consider an unusual case of pneumoconiosis.

The original complaint of the patient was shortness of breath, cough and expectoration of about nine months' duration.

The *family history* and history of tuberculosis contact were negative.

The *past history* disclosed pneumonia and typhoid in childhood. His occupation was construction foreman at the time he stopped work. For the last 18 years patient had worked at grading roads, in rock quarries, laying concrete streets, and sidewalks. Two years ago he was construction foreman in tunneling through white stone, type of rock unknown. This work lasted one year. He stated that the dust was very dense in the tunnel and when they came out at night their clothes were covered with fine white sand. In drilling they used no water or masks. He further stated that the men worked in this construction were all in poor health at this time. For the next nine or 10 months following this work he was occupied improving roads and doing patch work on the streets.

Present illness started nine months before admission to the hospital. At the onset he was taken with a bad cold, severe coughing and some expectoration. This gradually grew worse and he started to lose weight. One month later he entered a hospital and remained two weeks. There they diagnosed his trouble as bronchitis, and made an autogenous vaccine from his sputum. This was given him, which caused a severe reaction. He had remained in bed, having night sweats, but no elevation of temperature. At the onset of the trouble he expectorated profusely, but at the time of admission it was much less.

Physical examination—Patient was well developed, but somewhat emaciated. He was lying on his right side and was very dyspneic, pausing between each two words to catch his breath. The scalp was negative. Eyes: There was a complete cloudiness of the right lens with adhesions to the iris. Nose: The nasal mucosa was inflamed. Teeth were in poor hygienic condition. The posterior pharynx was markedly injected. Neck: There was no glandular adeopathy, but some abnormal venous pulsations were noticeable. Chest: Symmetrical, but expansion was limited bilaterally, and there was practically no expansion in the lower half of both lungs. With each inspiration the intercostal spaces were drawn in forcibly in the lower two-thirds of the chest. The chest was of the obstructive emphysematous type. Over the lower part of the left lung there was hyperresonance; the entire chest was fairly resonant throughout. On auscultation there were scattered areas of fine rales at the apices, as the base was approached they became louder and more confluent. In the lower half of the left lung the character of the rales changed, they were more atelectatic in character and on expiration there was an expiratory wheeze. The breath sounds on both sides were broncho-vesicular down to the second interspace, but below this point they were clearly bronchial. The heart was somewhat hypertrophied and the muscular tone was weak. The valvular sounds were hardly audible. Blood pressure was systolic 110 and diastolic 70. Abdomen, genitalia and extremities were normal. On admission the temperature was 98.

Laboratory Findings — The urine showed a trace of albumen, an occasional pus cell and many hyaline casts. The blood examination revealed an erythrocyte count of 5,190,000, hemoglobin 100% (Dare), leucocytes 8,150, differential count; polynuclears 79%, small lymphocytes 20%, large lymphocytes 1%. The blood sedimentation rate showed a fairly rapid fall of the erythrocytes. Sputum was negative for tubercle bacilli.

X-ray Report—The lower half of each lung shows dense consolidation with exception of costophrenic angles which show some evidence of air. The density is not quite so heavy at the lung periphery as around the hilum. Numerous tubercles can be seen in the upper half of both lungs with fairly clear apices. This patient seems to have very little breathing space due to the dense consolidation. Roentgenological diagnosis: Dense pulmonary fibrosis, probably pneumoconiosis. The patient gradually became more dyspneic and on the third day after admission his temperature went to 99, pulse 100, respiration 40. The temperature gradually rose, when on the 12th day just before he died, it was 103 and respiration was 60.

Autopsy Findings—At autopsy the lungs were retracted from the chest wall. The heart was markedly enlarged. Macroscopically the lungs were hard and dense and showed almost complete consolidation throughout, and the pleura was adherent to the chest wall in many places. Some crepitation was elicited in the apices, but this was very limited. The consolidation was symmetrical in both lungs. The left lung weighed 1200 grams and the right lung 1350.

Pathologists Report — Tissue study revealed: Nodular often peribronchial and perivascular as well as diffuse fibrous tissue overgrowth is present in all the sections. Proliferating frequently collagenizing connective tissue extends interstitially along the alveolar septa producing marked thickening of the alveolar walls and frequent alveolar collapse. In areas of broad or diffuse scars and granulation tissue, semblance of lung tissue is lost. These areas usually show diffuse infiltration of lymphocytes and macrophages and many of the latter are laden with black amorphous and granular pigment, also similar extracellular pigment as well as broad irregular crystalloid particles and elongated spicules are present. Collapsed alveoli are lined with large swollen epithelium frequently showing dissociation and desquamation. There are numerous dilated air sacs and bronchi, many of which contain abundant granular and amorphous acidophile debris as well as degrenerated epithelium and pigmented macrophages. Multinucleated foreign body type giant cells are infrequently seen in alveoli and in areas of granulation. Throughout the sections, including the less fibrosed lung, the septa are thickened and infiltrated with macrophages and the alveoli are more or less filled with desquamated epithelial cells, pigmented and non-pigmented macrophages, and fibrin-serum coagulum. The pigment here may be either brown granular (blood pigment) or may be as fine and coarse black granules. The contents of many alveoli and bronchi are necrotic. Especially the larger bronchi and blood vessels show peribronchial and perivascular thickening and anthracotic scarring. Many vessels show intimal and medial hypertrophy, and one large vein is almost occluded by eccentric granulating endophlebitis. The thickened granulating pleura together with an underlying broad zone of black pigmented lung tissue shows dense fibrosis, vascularity, and dilated sometimes occluded lymphatics, and is densely infiltrated with lymphocytic infiltration of the wall.

The ash content was determined by grinding samples of lung and placing them in an oven at 100 C. where they remained until they maintained a constant weight. This was then heated in an electric furnace until all organic material was destroyed. The residue was weighed and calculated as the total ash. The total ash was then treated with hydrochloric acid and the insoluble portion filtered off and weighed. The residue was acid insoluble ash. In order to assay the insoluble ash it was treated with hydrofluoric acid, and this gave us our silica content which was 50.5%. The total ash content was 2.08%.

Surgery in Facial Burns

DR. HOWARD L. UPDEGRAFF, *in Journal of the American Medical Association* (October 7, 1933):—This paper is a general discussion of the various methods used in reconstructive surgery in the treatment of old facial burns.

The author summarizes his views as follows:

Reconstructive surgery of old facial burns should be avoided if possible until complete healing has taken place. The possibility of loss or impairment of various special sense organs may necessitate earlier surgery.

Adherent eyelids, nasal contours and ears are best released by use of Stent grafts.

Release of major contractions in areas difficult to immobilize and dress correctly may be accomplished by the use of intradermal grafts, tunnel grafts and small tube flaps.

The basal metabolic rate should be checked and, if low, thyroid medication should be forced.

Autogenous bacteriophage therapy is helpful if positive Rosenau tissue cultures can be made.

Early roentgen therapy is of benefit following surgery.

Endotracheal anethesia is the method of choice in the reconstruction of old facial burns.

Eye Examinations

R. H. SEIP, *in The Sight-Saving Review*, (September, 1933):—This survey included the examination of the eyes of 1,265 employees in a zinc ore plant, and disclosed that approximately 17% suffered from seriously defective vision.

Vision was not recorded as defective unless the defect was greater than 20/40 in one or both eyes. A large percentage of those with defective vision had never had any correction. Others had had correction, but did not have their glasses with them at the time of the examination. Others who had had correction indicated that a change in correction was needed.

Employees whose visual tests indicated the advisability of further examination with a view to correction were advised to have such examination made. No recommendation was made as to whom they should consult, except that they were urged to consult a competent medical specialist.

Of the 118 employees advised to have complete examinations, 87 accepted this advice. Among the remaining 31 were a large number who already had glasses, but of which fact the company had no previous record.

The examination revealed 63 employees with a visual acuity of 20/200 or less in one or both eyes. It was felt that such employees should have adequate protection from industrial injury that might affect the remaining vision. It was determined, therefore, to require those of this group whose duties were in any way hazardous to the eyes to wear safety goggles continuously when on duty.

It may be interesting to note of the 63 cases with vision of 20/200 or less, 31 were supplied with prescriptive goggles; 25 were required to wear plain goggles, and seven were not required to wear goggles, owing to the type of work in which they were engaged.

THE BULLETIN

of

The American Association of Industrial Physicians and Surgeons

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Armour & Co., Union Stock Yards, Chicago

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THE OBJECT of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for the mutual advancement in the practice of their profession.

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ANNUAL MEETING

THE 1934 Annual Meeting of the American Association of Industrial Physicians and Surgeons will be held in Cleveland, Ohio, Monday and Tuesday, June 11th and 12th. Headquarters will be in the Hotel Statler and the program and arrangements will be in charge of a committee of which Dr. A. G. Cranch, of the National Carbon Company, is the present chairman.

This will be the first meeting of the Association since 1931, and under the able direction of Dr. Cranch it should be a notable one. Since it coincides in point of time with the Annual Meeting of the American Medical Association, reduced fares will be granted by all railways. All members should plan to be present and should make hotel reservations early.

This meeting will be a very important one, as it will be necessary to elect new officers and an entirely new Board of Directors.

Like many of our other activities, our attendance upon medical meetings has been somewhat curtailed during the past three years; this will be a splendid opportunity to renew contacts, discuss problems and generate a new enthusiasm in our special line of work. As our meetings precede the scientific sessions of the A.M.A., to those who can remain a few days longer, its meetings will offer an excellent post-graduate course and acquaint you with many new things that have transpired in medicine during the past three years.

Tentative Program
Nineteenth Annual Meeting
Cleveland, Ohio
June 11 and 12, 1934

MONDAY: June 11, 9 a. m., Hotel Statler:

1. Business Meeting.
2. (Traumatic Neuroses).
3. (The Physician as a Witness).

MONDAY: June 11, 2 p. m., Cleveland City Hospital:

SYMPOSIUM ON SILICOSIS:

1. SILICOSIS: "Occurrence, Etiology, X-ray and Clinical Findings and Prognosis" (Illustrated by films, slides, etc.) Emery R. Hayhurst, M.D., Chief, Division of Hygiene; Consultant, Occupational Diseases, Ohio Department of Health.
2. SILICOSIS: "Relation to the Tuberculosis Problem"; R. C. McKay, M.D., Chief, Division of Tuberculosis, Cleveland City Hospital.
3. SILICOSIS: "Medicolegal Phases"; C. O. Sappington, M.D., Dr. P.H., Consulting Industrial Hygienist, Chicago, Ill.

MONDAY: June 11, 7 p.m., Hotel Statler:

Banquet, Nineteenth Anniversary;
President's Address;
Address: (Speaker to be announced)

TUESDAY: June 12, 9 a.m. Clinical Meeting, City Hospital:

1. Clinical Presentation of Acute Traumatic Cases; Members of Staff, Division of Surgery, City Hospital.
2. Plastic Repairs of Extensive and Mutilating Injuries; Donald M. Glover, M.D., Cleveland, Ohio.
3. Fractures of the Long Bones: George I. Bauman, M.D., Chief, Division of Orthopedic Surgery, City Hospital.

TUESDAY: June 12, 2 p.m., Cleveland, Clinic:

1. Repair of Tendon Injuries; James A. Dickson, M.D., and Wallace S. Duncan, M.D., Orthopedic Dept., Cleveland Clinic.
2. Conservative Treatment of Compound Fractures; Walter G. Stern, M.D., Cleveland, Ohio.

Workmen's Compensation---A Growing Burden on Industry

By F. Robertson Jones*
General Manager,
Association of Casualty and Surety Executives,
New York

IF THE tendency towards extending the scope of the workmen's compensation system to include life, health, accident, old age and unemployment insurance for workers is not promptly altered, I believe there will be a complete breakdown of that system. This is not because of any objections there may be to requiring industries to provide these additional forms of protection in whole or in part to their employees. It is rather because our workmen's compensation laws, their scale of benefits, and the administrative procedure under them are not adapted or suited to such situations. If the compensation principle is limited to its own proper sphere and is not enlarged so as to include all the ills that flesh is heir to, it is practical, workable and beneficient. If it invades foreign realms, it is bound to grow into a veritable Frankenstein which will harm principally those it is supposed to aid, and, at the same time, will promote waste, fraud and industrial demoralization. Compensation risks will become almost uninsurable; the cost to business will be intolerable; the development of sound relief measures which will give to labor the protection now sought by the uneconomic device of enlarging the compensation law territory will be retarded.

Emotional reformers, with labor instinctively cooperating, largely are responsible for the agitation to have the coverage of the compensation laws extended. Pleas for "social justice," no matter how demagogic, always appeal to a large audience, and that audience is growing daily. That is why it is so difficult to combat this kind of propaganda, even though the opposition has on its side both facts and equity. The program of these reformers would stretch the compensation coverage far into fields which, in my opinion, can only be properly dealt with by personal accident, health, old age and life insurance, plus some form of unemployment relief, with lower levels of benefits and different distributions of the cost. No compensation law ever has been extended that far, but altogether too much progress is being made in that direction, and it is to the accelerated haste of this progress and some of the reasons for it that I wish to call your attention.

As an illustration of the distressingly common misrepresentations and criticisms of the present compensation system, coming from uninformed but probably sincere sources, I call your attention to an article in "The Nation" of January 25, 1933, entitled "Our Mangled Compensation Laws." The author, a woman, violently criticises all compensation laws as being narrow, technical and falling far short of guaranteeing to all wage workers and their dependents 100% indemnity for all losses from injuries to body or health in any degree occasioned or contributed to by any circumstances of employment—plus unlimited medical benefits. If she had her way, compensation would cover everything; and industry, willy nilly, would have to pay the bill. Of course, such a scheme is not only visionary, but entirely impractical; and if put into effect, the worst sufferers would be labor and not employers, because labor can derive no benefits beyond the capacity of industry to pay the bills. This phase of the question, however, is usually ignored by such propagandists; and uninformed readers are led to agree to programs of this type because, at first glance, they seem to be humane, and to meet a social need.

I do not claim that the present compensation system is perfect, and I freely admit that there is need of reform—imperative need; but the way to reform lies in the direction opposite to that outlined by the article referred to. The need is to turn back and restore the workmen's compensation law to conformity with its original principles. Workmen's compensation was designed as a substitute for the old employers' liability law. It was never intended to be a panacea for all the misfortunes which might befall the workman. It was simply a plan to abolish employers' liability for full damages for occupational injuries due to negligence, and substitute for it liability, regardless of fault, limited to a fixed proportion of the wage loss, for all injuries caused by "trade risks" —i.e., by those special risks for the causation of which employment is responsible. Nearly all departures from that original program are misapplications of the principle of compensation and work badly in one way or another.

HOW far our compensation laws have been stretched beyond a reasonable application of the principles underlying the original program may be roughly indicated by the following illustrations:

1. An employee, suffering from some form of heart disease, falls dead while ascending a short flight of stairs after attending a conference at his employer's office. His widow is entitled to compensation.[1] A miner, who has eaten something for breakfast which has disagreed with him, dies from the bursting of a blood-vessel, caused by a fit of vomiting while at work. His widow is entitled to compensation.[2] These cases are typical. It is the majority rule now that the employer owes compensation to an employee or his dependents for all the harmful consequences to him of going to work while unwell. Manifestly that is life and health insurance, rather than compensation for injuries caused by occupational risks.

2. An elderly employee with a weak heart, who has recently suffered an occupational accident, while on his way to work runs to catch a street car and falls dead from the exertion. If there be any medical opinion evidence to the effect that the accident at all aggravated his heart trouble, his widow is entitled to compensation.[3] Here, again, we have what is practically health insurance, the old accident being simply a pretext for imposing liability for compensation.

3. An elderly man suffers an accident which unquestionably disables him for a short time. Thereafter he decides that he is unable to return to any work. The doctors can find no remaining disability from the accident but do find that he has arteriosclerosis, myocarditis or some other of the physical ills to which the aged are subject, probably a little aggravated by the accident, and that he is about "played

*Address delivered at the 143rd meeting of the American Institute of Mining and Metallurgical Engineers, at New York, N. Y., February 20, 1934.

1. Cf. Berman v. Wasserman Co., (N. Y. App. Div.), *Industrial Bulletin*, Sept., 1933.
2. Cf. Clark v. Lehigh Valley Coal Co., 264 Pa. 595.
3. Cf. Staunton v. Mennig, (N. Y. App. Div.), *Industrial Bulletin*, Sept., 1933

out." He is entitled to compensation for permanent total disability.[4] Manifestly this is old-age insurance.

4. An employee suffers fright, shock or pain from an occupational accident. Then, although there is no physical disability, he develops a state of mind or nerves which disables him from work. It is the prevailing medical opinion that this condition—formerly called "malingering" but now euphemistically termed "traumatic neurosis" —is propagated and, where it occurs, is perpetuated by awards of compensation payments—that the cure for it is a prompt final settlement of compensation. Yet it is generally the law that where an employee develops this condition, he is entitled to periodical compensation payments for total disability as long as the condition continues.[5] This is not compensation for disability caused by trade risks. Rather it is compensation for disability caused by improper provisions in the compensation laws.

5. Where salesmen or chauffeurs, using their own or their employer's cars, are killed or injured in accidents while off their proper routes or out after business hours, entirely for purposes of their own, such injuries, in many states, are compensable if at the time of the accidents the injured persons were headed toward their home, offices or back to work.[6] This is certainly stretching the compensation law far into the field of unrestricted life and personal accident insurance.

Then, our compensation laws quite frequently ignore the principle that the compensation for an injury should be limited to a proportion only of the wage loss.

An abuse which has assumed great importance in this period of depression, arises out of the fact that many of our compensation laws fix the "weekly wage," upon which compensation payments are to be computed, at fictitious and exaggerated levels. Thus the Pennsylvania law prescribes that the "weekly wage" shall be taken to be never less than 5½ times the average daily wage, even though the injured person averages much less than 5½ days' work per week. This is now frequently resulting in compensation far exceeding 100% of the wage loss—which, manifestly, is highly conducive to malingering, besides disturbing the relation between losses and payrolls and thereby necessitating onerous increases in premium rates in periods of depression.

Similarly, many of our laws provide for compensation for partial incapacity, based upon the difference between what the employee was earning when injured and what he is able to earn upon returning to work. Thus, in a New York case,[7] a man was injured while working a six-day week; upon termination of temporary total disability he got a job at approximately the same hourly rate of wages, but for only four days a week, because his industry was then working short time; and it was held that he was entitled to compensation for a 33 1/3% reduction in earning capacity. Manifestly that is not compensation for the loss from an injury, but something in the nature of an unemployment insurance benefit, entirely alien to the purposes of the compensation law.

This perversion of compensation is an important factor in augmenting the flood of applications, which the hard times are inciting, for renewed or increased compensation for old and often forgotten injuries. Multitudes of workmen, in the good times suffered from accidents which left some permanent impairment so trifling that it did not interfere with their resuming their old jobs at their old wages. Since the bad times came, however, many of these men, in common with others have been laid off, put on short time, etc. Consequently they have been applying for compensation or increased compensation, and their old injuries have been and are being re-rated to compensate them for their wage losses resulting from bad times.[8] Whatever else should be done for the relief of unemployment, it is manifestly oppressive to industry and its insurers and demoralizing to the community to have unemployment relief doled out in this way under pretense that it is compensation for occupational injuries.

In many other ways than those I have mentioned our compensation laws convert occupational injuries into sources of profit. Of those other ways, one of the most flagrant, which it may be well to mention for illustration, is the case of the "death-bed widow." Of course where a married man is fatally injured, his widow suffers a loss for which she should be compensated. But it is very different where an unmarried man is fatally injured and, on his death bed, is married to a nurse or some other "golddigger." Yet that "made-to-order" widow, though she has suffered no loss, is entitled, in New York, to compensation until death or remarriage, and, in Pennsylvania, to compensation for 300 weeks or until remarriage. Can industry afford to keep on distributing such gratuities?

EVEN with the faults I have indicated, the compensation laws would not be so much in the nature of a menace if they were applied with reasonable regard to facts — to the truth. But, quite widely they are not. The original idea for the administration of the compensation law was to get rid of slow and wasteful litigation before judges and juries and to have controversies promptly, summarily and informally adjudicated; but employers were to be safeguarded against fraud, impositions and stale claims by requirements for prompt notice of accident and prompt claim for injury; and, though it was understood that claimants should be given the benefit of the doubt in cases of reasonable doubt, it was not contemplated that in the decision of controversies the fundamental principles of evidence should be ignored.

But the compensation laws now, variously, depart far from that original program. Many of them omit the requirement of notice of accident in cases of alleged fatal injury; many of them require no notice of "accident" at all, but only notice of "injury"—which notice need not be given until so long after the happening of the alleged cause of the injury that the notice is practically useless for any of the purposes for which required; many of them empower the Compensation Board to excuse belated notice of accident or injury and to admit belated claims on almost any pretext; many of them provide that there shall be no finality in compensation cases, but that such cases shall remain perpetually open to repeated litigation and that awards may be modified and increased or prolonged whenever the Compensation Board may feel moved to do so; many of them empower the Compensation Boards finally to decide all questions of fact regardless of the weight of evidence; many of them

4. This is a composite picture of multitudes of cases decided to the effect stated.
5. Cf. Postal Telegraph Co. v. Industrial Commission, 345 Ill. 349.
6. Cf. Pressed Steel Co. v. Industrial Commission, 340 Ill. 68; Fronce v. Prosperity Co., 225 N. Y. 613; Hecht v. Enterprise Co., (N. Y. App. Div.), *Industrial Bulletin*, May, 1932; Cornell v. American Fruit Growers, 253 N. Y. 543.
7. Polizzi v. Cudihy, (N. Y. App. Div.), *Industrial Bulletin*, June, 1933.
8. Cf. Santo v. Symington Co., (N. Y. App. Div.), *Industrial Bulletin*, Jan., 1933.

provide that the "common law rules of evidence" may be ignored; and some of them provide that every claim for compensation shall be presumed to be valid, unless the negative be proved "substantial" evidence. Such provisions of law practically invite fraud, impositions and speculative claims. And though many of the Compensation Boards strive generally, and some strive always, to restrict their awards to meritorious cases, yet the average result is to saddle industry with the burden of a heavy subsidy for frauds and exaggerations.

I think that I have specified enough to make it evident that our compensation laws, or many of them, are being extended dangerously far beyond their proper functions. In an address entitled "Ominous Abuses Threatening the Insurability of Workmen's Compensation," delivered by me September 8, 1932, I enumerated and explained the perversions in the compensation laws more comprehensively and pointed out specifically what I deem to be the appropriate remedies. If you will study that address, I think you will be satisfied that workmen's compensation in this country has reached a crisis—for industry as well as for insurance carriers.

In this connection bear in mind that I am not arguing for low compensation benefits. To the contrary, I believe that the compensation for true victims of occupational injuries should be as generous as industry can afford —within limits substantially below the wage loss. I contend merely that compensation should be reserved for the losses from occupational injuries alone, and that other misfortunes of workmen need to be provided against by other kinds of insurance or relief, based generally upon different principles of responsibility and different distributions of the cost.

Further in this connection, I venture to express a most emphatic opinion that no relief from the dangers of the present crisis in workmen's compensation can be expected from resort to monopolistic state fund insurance. That would plunge the whole matter yet deeper into politics. No industry could benefit therefrom, save by favoritism in an inequitable distribution of the cost or by insurance below cost —result in the accumulation of deficits for a future day of reckoning. The fallacy of a temporary saving through cheap and consequently inefficient administration of compensation insurance, ought now to be sufficiently evident from recent experience in Ohio, Washington and other monopolistic compensation insurance fund states.

THERE remain two difficult problems in connection with workmen's compensation which I have reserved for separate discussion. The first, the problem of the medical benefits, is in open controversy everywhere. The second, the problem of occupational diseases, has recently become acute in some states, and, probably, will soon be agitated in nearly all the states.

In discussing medical benefits, it may be observed that, in a way, the medical profession has been the principal beneficiary of workmen's compensation. In New York, for instance, doctors and hospitals have been paid in excess of $10,000,000 under the compensation law, in a single year, in comparison with "next to nothing" under the old liability laws. Yet the medical profession is highly dissatisfied and is carrying on organized campaigns to have the laws amended to remove the control on the medical services and their cost now exercised by employers and insurers through their right to select the physician, etc.

There is no doubt but that employers, and insurers, have made and occasionally are still making mistakes in furnishing the medical benefits; and it may be that we shall be forced to accept some such a regime as recommended in the recent report of the New York Governor's Medical Committee on Workmen's Compensation. Under such a regime, I think we could count on a medical service of fairly high quality; but I cannot see how it could be expected to check the mounting cost of the medical benefits, which even now is about as high as industry can bear. The outlook is not encouraging. I am inclined to believe that industry and insurance carriers have "fumbled the ball" in not, at the start, having established a cooperative contract system for providing the medical benefits in compensation cases. However that may be, certainly it would be a godsend if we could shift over to the British system, under which the employer is subject to no obligation to furnish medical benefits to an injured employee, but only to an economic incentive to see that the employee gets such treatment as will best reduce the loss; or to the German system, whereunder the burden of providing medical benefits for the first 13 weeks of disability is imposed upon mutual benefit societies, supported two-thirds at the expense of employees and one-third at the expense of employers—thereby interesting the employees in the struggle to keep down the medical cost.

The situation in regard to occupational diseases is equally important. The original compensation laws covered only injuries "by accident." Later, however, many of them have been extended to cover also "occupational diseases"—i.e., diseases caused by peculiar health risks due to the nature of the occupation in which the disease was contracted. This development has some logical basis and, right or wrong, will soon be generally accepted. But experience and the more successful precedents support the propositions that the diseases to be covered need to be distinctly specified and defined; that the diseases so specified should include only diseases which in individual cases can be distinguished from diseases of ordinary life; and that the liability to compensate for such diseases should be subject to special provisions of law, different from those governing the liability to compensate for accidents. To be avoided like sin is the "all-inclusive" coverage, peculiar to a few American compensation laws, which provide for compensation for all "injuries" or "occupational diseases" arising out of the employment, without defining what is meant by "injuries" or "occupational diseases," and upon terms and conditions reasonable only for sudden injuries "by accident" and not at all suitable for injuries by gradual contraction of a disease. These conclusions you will find to be strongly supported and the reasons therefor well-explained in a "Report by the Pennsylvania Commission on Compensation for Industrial Disease," submitted to the Governor of Pennsylvania, March, 1933.

Generally, all diseases caused by handling of, or other exposure to, poisonous substances, fumes, liquids, etc., are classified as occupational diseases. However, I think we may go further and recognize that, with one or two possible exceptions, all the diseases "scheduled" in the New York law are properly classified as occupational diseases. But doubt arises when we reach the dust diseases of the lungs—generally called "pneumoconiosis." The so-called diseases in this category are

rather physical conditions predisposing to other diseases and are generally so complicated with diseases of ordinary life that it is difficult to diagnose them; and medical authorities warn strongly against making them compensable without the utmost precautions. But one form of pneumoconiosis, namely silicosis, can now frequently be identified to be of occupational origin and is a serious ill in many industries. Consequently, in recent years, silicosis has been specifically made compensable in a number of countries, including Great Britain and many of its Dominions.[9]

All the information available—and it is to be realized that this is a new subject, still in an experimental stage, with very little completed experience, much of it very obscure and some of it most unsatisfactory—confirms the medical warning that if silicosis, asbestosis and possibly other forms of pneumoconiosis are to be made compensable, they must each be distinctly defined and the right to compensation for them must be specially and strictly regulated and conditioned—as under the British "Silicosis and Asbestosis Schemes," or the South African miners' silicosis compensation acts and regulations. But howsoever strictly these diseases may be defined and the right to compensation therefor regulated and conditioned, it is probable that, in many occupations, the cost will be incalculable or unendurable, unless the most stringent and comprehensive medical control and measures for prevention be resorted to.

IN compensation for silicosis—and I suppose the same is more or less true of all other dust diseases of the lungs—there are several peculiar features that present problems extremely difficult of solution.

(1) Silicosis is an "injury" which generally or often develops very slowly, through long years of exposure. Consequently, whenever a law imposing liability for compensation for silicosis may take effect, there will be a large accumulation of "incurred" but as yet "unaccrued" liabilities to be provided for. How is that retroactive effect to be avoided or met? Certainly if insurance carriers on risks in the future are to be expected to meet the silicosis losses then accruing but resulting from long years of exposure in the past, the rates they would have to charge would be startling.

(2) According to the best of my information, silicosis is seldom fatal; but in multitudes of cases where workmen, who have been exposed to silica dust for large parts of their lives, die from diseases of ordinary life or old age, silicosis will be found to be a contributory cause of their deaths. But, under the compensation laws generally, where a compensable injury contributes to, aggravates or accelerates disablement or death principally due to some other cause, such as a progressive disease, full compensation is payable. If that rule should be applied in cases of silicosis it would convert the insurance against occupational injuries into full life and health insurance for all silicotics, the cost of which would be prohibitive.

(3) Again, according to the best of my information, silicosis is a disease which may progress after removal from exposure and no one knows how long after exposure disablement or death may truly result therefrom. Consequently there is a demand that there shall be no time limit on claims for silicosis—that is, where a workman is laid off for incipient silicosis and compensated for forced change of occupation or temporary disability, a claim 30 or 40 years later, for disability or death in old age alleged to have been contributed to by silicosis shall be deemed timely. A mass of such "hangover," speculative liabilities would be deadly for industry and insurance carriers. The alternative, a definite time limit on claims for silicosis, would be reasonable—and is essential, if silicosis is to be insurable; but it would be unpopular, and, even if incorporated in the law to start with might not last long in the spirit of "liberalization" now prevailing.

What I have just said is not supposed to cover the subject of compensation for silicosis and related diseases. It is intended merely to direct your thoughts to thorough consideration of the difficulties and dangers with which industry and insurance carriers are confronted.

IN conclusion, I would submit for your consideration a tentative suggestion. While we are bent upon restricting the compensation laws to cover only the losses resulting from strictly occupational injuries, labor, reinforced by popular sympathy, is driving to extend them to cover all injuries to body or health that flesh is heir to, howsoever occurring. In other words, labor needs and wants health and life insurance and looks upon an extension of the compensation law as the most readily available measure to supply that need. If we object to that program—and we have very sound objections to it—should we not then look for some alternative method of supplying labor's needs—in other words, study the most economic forms of employee's mutual benefit associations, with adequate sickness and life insurance features, to care for those afflictions of employees which the compensation laws do or should ignore, and institute a drive to organize them? In that way the pressure to pervert the compensation law to purposes for which it was not intended and is not adapted, would be relieved.

9. NOTE: For particulars of the various laws providing for compensation for silicosis and sometimes other forms of pneumoconiosis, see "Report by a Committee on Silicosis Presented to the American Public Health Association, October 9, 1933"; and "Report V" to the Eighteenth Session of the International Labour Conference, Geneva, 1934, published by the International Labour Office, 1933.

Soviet Doctor's Diary

WILLIAM H. STONEHAM, in *Chicago Daily News:* — The plight of soviet physicians, handicapped in their work not only by a lack of medicine but by mountains of "social work" and insufferably poor living and working conditions, is finally being taken up by the local press.

A "physician's diary" published by the *Evening Moscow* gives an insight into the life of this highly useful and necessary class of professional people.

"Page 1. Who are we? The newspapers call us the Commanders of Soviet Medicine, or 'the engineers of the medical industry,' or 'the steersmen of the public health.' But when this 'steersman' goes to the president of his house committee with a timid request for some of the facilities which engineers and technical workers enjoy he is told that he is 'an ordinary employee.'

'To whom do you give medical assistance?' 'To the people.'

'That's just too bad for you. According to the existing regulations only veterinaries enjoy the privileges of engineers and technicians.'

"When I examine the heart of a patient I keep thinking to myself: 'I wish it were a horse.'

"Page 2. Behind the door the patients are waiting. Some of them cough, some sneeze, those with rheumatism groan. And I sit and do social work. I am writing letters suggesting that people purchase medical

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literature. As soon as I am through with my patients I must run around to various houses and distribute these letters. A nice job for a specialist of 18 years standing.

"All doctors working in the ambulatoria — dentists, occulists, surgeons, gynecologists—are attached to households and must visit apartments to look for lice in the dirty linen. No one would think of sending an engineer to polish floors as 'social work.'

"We who have refused to hunt lice are called 'antisocial elements' and have been reprimanded and threatened with expulsion from our trade union. And so the doctors must obey. They distribute letters, hunt lice, perform disinfections and have no time to read current medical literature.

"Page 3. A doctor who works in an ambulatorium must examine 18 patients daily. But in fact we have to receive 35. The patient has not even time to undress himself. Today I had to listen to a heart through a heavy overcoat.

"Page 4. Again I read in the papers that we are the 'engineers of the medical indstury.' But the engineers have their closed cooperative stores, their rest homes and their evening coffee. And we who work in the big hospitals dream only of having a decent buffet.

"Page 5. I ask a patient 'where is your complaint?'

" 'At the ambulatory.'

" 'No, I mean why are you complaining?'

" 'Because I have been sick for eight days. I have called a doctor three times. One said I had lagrippe, another that I had typhoid fever, and the third said I wasn't sick at all.'

"This is probably true. What diagnosis can I make when I don't see the patient at the beginning of his illness and I know I won't see him at the end of it. I have simply become a bureau for issuing slips which will later enable the patient to receive his insurance money."

While this diary may be flavored with imaginative episodes, it is a general complaint of the soviet physicians that they are overworked, are compelled by ignorant "committees" to undertake the excessive amounts of extraneous work and are not given the privileges which are due them in the way of food and housing facilities. George Naoomovitch Kaminsky, new commissar for public health, is being called upon by the press to "put a stethoscope to the chest of the medical profession" and do something to correct its ills.

Fatigue

DR. DONALD A. LAIRD, *in New Republic*, (February 7, 1934):—"There is a limit set by nature on human work. Long hours simply defeat themselves by giving inadequate time for the sodium lactates, the 'fatigue toxins,' to be dissipated from the workers' muscles. Rest alone can accomplish this, and unless adequate rest is provided, fatigue accumulates, not only from hour to hour but from day to day, Tuesday's production dropping below Monday's, Wednesday's below Tuesday's, and so on through the week . . . This is the reason that overtime work is uneconomic, although some manufacturers never

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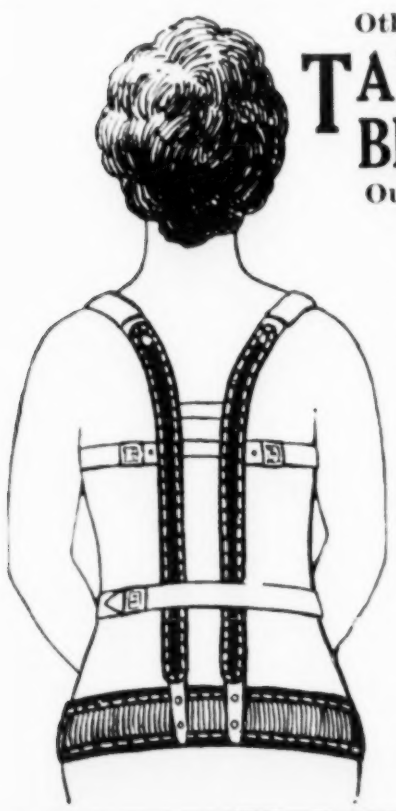

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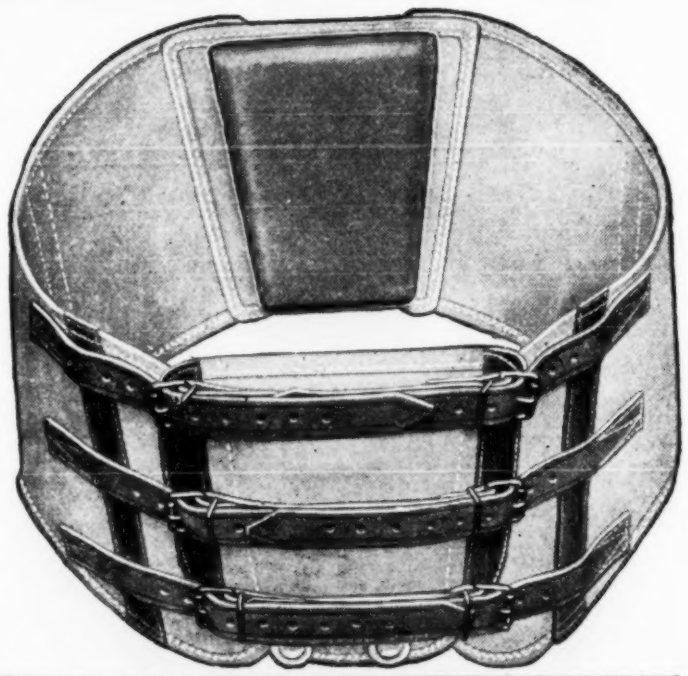

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realize what is actually going on . . . There is even a viciousness about occasional long hours. They stereotype work at a low level because the habits of manipulation or operation are slowed down by fatigue in one especially long spell, and this slowed rate is thereafter unconsciously adopted by the nervous organization as a standard. The employee who has been working an eight-hour day and who, for merely one day, works 12 hours, has his hourly work rate, even when back again at eight hours, slowed down for several days . . . It is only after a week or two that the shortened hours and consequent more complete fatigue recovery, make it possible for the new rate of working speed to show itself. And, it should be borne in mind that these new work habits, with their increased production, are a natural expression of nature's power themselves, unaided by any speeding up of machinery. Through the early progress of the N.R.A. for instance, I have been in close touch with several manufacturers. They were pessimistic. They saw the factory costs rising, and, actually most of their plants' production did fall during the first weeks under the shorter hours. But a recent check now shows that their hourly rate of production is better than when longer hours were worked. In some instances weekly production is greater than before."

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Carbon Monoxide Poisoning

DR. M. H. MAXWELL, *in West Virginia Medical Journal* (October, 1933):—Carbon monoxide is the most widely distributed of all present day poisons, being found in natural and artificial gas and wherever organic matter, such as oil, gas, coal or vegetable matter is burned, the amount given off depending partly upon the matter consumed but chiefly upon the conditions under which oxidation takes place. It is found in large quantities around foundries, in the smoke from furnaces that are improperly ventilated and in the exhausts from automobile engines.

The affinity of CO for hemoglobin is about 300 times greater than that of oxygen. This combination, called carbonic-oxide hemoglobin, is a fairly stable one, and for this reason the exposure to even a small amount over a long period leads to an accumulation of the poison in the blood and tissues accounting, for the cases of chronic CO poisoning. The effect of the poison is largely due to the loss in capacity of the blood to carry oxygen, but there is also an enormous increase in nitrogenous metabolism with muscular degeneration said to be surpassed only by phosphorus poisoning.

Postmortem findings consist chiefly of pneumonic changes in the lungs and fatty degeneration of the heart, liver and kidneys. Ecchymoses in the brain and meninges are not uncommon. Frequently, in the chronic cases, there is found a peculiar white deposit of undetermined character just under the cortex of the brain. This is known as the white line and probably has something to do with the nervous and mental changes so frequently observed in the long-standing cases.

Cases of CO poisoning may be roughly divided into the acute and chronic, depending upon whether a large quantity has been inhaled quickly or whether the poison has been accumulating over a longer period. The symptoms of the acute cases are due, almost entirely, to the anoxemia or loss of oxygen from the blood

while in the chronic cases there is added the degenerative processes throughout the body.

The author further classifies three general types of chronic poisoning as follows: the ordinary, the pernicious anemia, and the thyro-toxic types. Description of these different clinical pictures is given with illustrative case histories.

In the treatment of mild cases nothing is required but to get the patient into fresh air. The more severe acute cases need rest and an abundant supply of oxygen. If the patient has lost consciousness, artificial respiration may be necessary; and where the facilities permit a blood transfusion relieves the symptoms quickly and may save the life.

Contamination of Rivers by Lead Arsenate

A PUBLIC HEALTH problem of considerable moment which concerns both the industrial medical and public health authorities, is the proper disposal of industrial wastes. The Paris Correspondent of the American Medical Association has reported an interesting condition in the *Journal of the American Medical Association*, for March 31, 1934. The newspapers have contained accounts of dead fish observed in certain rivers of southern France. On investigation it was found that the action of waste waters from adjacent factories on the river banks could be eliminated, for several of the rivers had no factories on their banks. Vincent Richard, a chemist in the department of Ain, conceived the idea that the poisonings were due to lead arsenate, traces of which he found in these waters. Lead arsenate forms the base of various products, widely used in agricultural regions to combat the animal and vegetable parasites that infest grapevines and fruit trees. The surface waters carry off considerable quantities of lead arsenate, thereby introducing the poisonous substance into the springs and the rivers. Furthermore, when the lead arsenate is applied after the blossom of the grape has appeared, it penetrates the grape and can be found in the wine, which itself becomes a menace. Mr. Richard reported to the prefect of Ain the results of his observations and added that he had seen cattle die in Morocco that had eaten, along with pasture grass, locusts poisoned by arsenates. He stated also that birds die in large numbers after eating insects poisoned by products with an arsenic base, and that likewise arsenized wheat for the destruction of rats is extremely dangerous. The Comite superieur d'hygiene publique has been asked to look into this question. The Academy of Medicine has inquired into the matter at various times and has passed a resolution that agriculturists be prohibited from using arsenical products as insecticides. The agriculturists allege that there are no other substances quite so effective and so cheap, for this purpose. The resolutions of the Academy have consequently been ignored.

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Danger of Carbon Tetrachloride in Fire Extinguishers

AT THE Royal Society of Medicine, Sir William Willcox, the government toxicologist, discussed the toxic effects of substances of the carbon tetrachloride group, which are coming into increased commercial use. He said that they were all anesthetics, had a toxic action on the brain, were fat

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soluble, and were quickly absorbed. In 1909 a young woman fell dead while having her hair shampooed at a London store. The shampoo contained 4% or 5% of carbon tetrachloride, inhalation of which would give high percentage in the blood. Death was due to the action of the poison on the heart muscle. Recently he had seen three cases of patients in a hospital who had been subjected to the vapor of carbon tetrachloride, which had been used for extinguishing fires on board ship. In all these cases the blow of the poison fell not, as he expected, on the liver and brain, but on the kidney. All showed great impairment of renal function. In one of the most remarkable cases of its kind he had ever seen, the urine was completely suppressed for 10 days, but there was complete recovery. Capt. S. F. Dudley, a naval surgeon, described the cases due to the fire extinguisher that were under his care. In the first one, vomiting and gastric disturbance were followed in a few days by mild jaundice. After 10 days epileptiform convulsions with a blood pressure of 220 and blood urea over 300 suddenly began. Edema of the lungs developed and death seemed inevitable but the man made a remarkable recovery. The only change in the urine was mild albuminuria. The patient had only five minutes' exposure to the vapor of carbon tetrachloride. Capt. Dudley referred to a more recent fire in an electrical workship in the dockyard, where 30 cylinders of fire extinguisher were employed and 15 men were exposed to the vapor for from five minutes to half an hour. But it was a big, well ventilated workshop. One man had nausea and vomiting, but he attributed this to sickly fumes from burning electrical installations. Examination of the men showed nothing abnormal except a trace of albuminuria in one. Capt. Dudley suggested that slight cases of poisoning from extinguisher vapors were common and easily missed. —London Correspondent, *J. A. M. A.* (March 17, 1934).

Automobile Accident Due To Effect of Insulin

THE case was reported some time ago of a physician who was convicted of driving an automobile while under the influence of alcohol. He had diabetes and his defense was that his condition was due to insulin treatment. He appealed from the conviction but died from the disease before the case came on again. Insulin has now been the cause of conviction, without any question of alcohol. A man with a clean record as a driver drove his automobile almost at a walking pace between two lines of traffic and collided with three vehicles on the off side. The drivers shouted at him but he did not stop. He then collided with a stationary van, and his car skidded and he came to a standstill on the pavement. A policeman found him in a dazed condition, only partly conscious of what was said to him. He had diabetes and the police surgeon certified that he was under the influence of insulin and unfit to drive a car. Dr. George Graham, an authority on diabetes, gave evidence that the patient would generally have ample warning of any reaction from insulin and that his condition on the day of the accident might be due to the fact that improvement was taking place more quickly than he realized. The physician pleaded guilty to the charge of driving while under the influence of a drug, which is an offense under the road traffic act. He was fined $1 and ordered to pay $42 costs and his license was suspended for five years, but he was informed that he might apply for revision of the suspension after six months if he was medically fit.—London Correspondent, *J. A. M. A.* (October 21, 1933).

New Jersey Commission on Silicosis and Pneumonoconiosis

FEBRUARY 15, 1934, a Commission, appointed in 1933, to study silicosis and pneumonoconiosis, reported to the New Jersey Legislature at some length, at the same time submitting a bill to bring silicosis under the workmen's compensation law. The report concludes:

"In general, the provisions for compensation for injury by silicosis should be the same as for injury by accident. There is, however, one condition which applies to silicosis that does not apply to accidents. In respect of accidents it is not foreseen in the particular instance that accident and consequent disabling injury will occur. In the case of silicosis, knowledge of the condition may, in every case, precede by some time any disablement. It is desirable that an employee who shows the first, but not disabling, stage of silicosis, should be removed from exposure to further inhalation of dust containing free silica, combined silica, or both. Such change of occupation by the workman should not be at the workman's cost but should be at the cost of the employer provided there is any impairmen of earning capacity. To put the matter another way, the workman may not be personally disabled by silicosis but nevertheless should enter a dust free occupation rather than remaining exposed to dust. Means should be found to facilitate this change of occupation. If the change does not result in loss of earn-

ings to the workman no compensation should be payable to him at the time. If, however, the employer cannot furnish or procure employment for the workman which is proper in the opinion of the medical board or if the compensation of the workman in his new employment is less than in his previous employment, then the workman should be compensated.

Industrial Medicine News

Industrial Sickness During Last Quarter of 1933

DEAN K. BRUNDAGE, Statistician, Office of Industrial Hygiene and Sanitation, U. S. Public Health Service, reports that during the fourth quarter of 1933 the incidence rate of cases of illness causing disability for eight consecutive days or longer among 154,000 male industrial employees was lower than in the corresponding period of any one of the four preceding years. The rate compares very favorably with that for the fourth quarter of 1932 on account of an outbreak of influenza which started in November of that year. The influenza rate during the recent quarter-year was less than half the magnitude recorded for the last quarter of 1932. As might be expected, the pneumonia rate was lower than in the same period of the preceding year; but it was higher than in the fourth quarter of 1931. A favorable rate is indicated for new cases of tuberculosis of the respiratory system during the closing months of 1933. Diseases of the upper respiratory tract caused fewer eight-day or longer absences from work than in the corresponding period of 1929, 1930, and 1931.

For non-industrial injuries the rates remain remarkably constant; i.e., about 13.5 cases per year per 1,000 men.

The relatively low sickness rate for the recent quarter was due principally to a decrease in the non-respiratory diseases. This is the first time that non-respiratory cases have decreased in frequency enough to lower appreciably the rate of total sickness. The fourth quarter rate for non-respiratory diseases was 37.5 cases per 1,000 men per year as compared with an average or expected rate of about 46.0 for the period. Within this very broad disease group no single disease or group of related diseases accounted for the lower incidence rate for the group as a whole; the favorable showing resulted from somewhat lower rates for a number of different pathological conditions, among which may be mentioned diseases of the stomach, hernia, the rheumatic group, neurasthenia, and even the circulatory-genito-urinary diseases. Little change, however, took place in the occurrence of appendicitis, "other" digestive diseases, the more serious diseases of the nervous system embraced in the category "other diseases of the nervous system," and the apidemic and endemic disease groups. On the whole, however, morbidity as gauged by the frequency of claims for sickness benefits in a sample of the industrial population of the country presents a favorable picture in comparison with the fourth-quarter results for each of the four preceding years. (See the table.)

Diseases and disease groups which caused disability	Annual number of disabilities per 1,000 men in the fourth quarter of				
	1933	1932	1931	1930	1929
Sickness and non-industrial injuries*	78.0	104.3	84.3	87.2	96.6
Non-industrial injuries	13.5	13.9	13.5	13.0	13.1
Sickness*	64.5	90.4	70.8	74.2	83.5
Respiratory diseases	27.0	44.9	25.2	27.6	37.1
Influenza and grippe	12.3	29.8	10.7	11.6	15.1
Bronchitis, acute and chronic	3.4	3.1	3.5	4.2	6.2
Pneumonia, all forms	2.2	2.6	1.7	2.5	3.1
Diseases of the pharnyx and tonsils	3.6	4.0	4.5	4.3	6.8
Tuberculosis of the respiratory system	0.6	0.8	0.8	0.8	1.1
Other respiratory diseases	4.9	4.6	4.0	4.2	4.8
Non-respiratory diseases	37.5	45.5	45.6	46.6	46.4
Diseases of the stomach, cancer excepted	2.9	3.5	3.8	3.9	3.7
Diarrhea and enteritis	1.0	1.1	1.2	1.5	1.4
Appendicitis	3.4	3.6	3.6	3.4	3.8
Hernia	1.0	1.7	1.5	2.1	1.3
Other digestive diseases	2.9	3.1	2.9	2.9	2.5
Rheumatic group, total	8.3	10.6	9.9	10.4	12.1
Rheumatism, acute and chronic	3.5	4.8	4.4	4.9	5.0
Diseases of the organs of locomotion	2.8	3.3	3.4	3.3	4.0
Neuralgia, neuritis, sciatica	2.0	2.5	2.1	2.2	3.1
Neurasthenia and the like	0.8	1.0	1.4	1.2	1.1
Other diseases of the nervous system	1.3	0.9	1.2	1.0	1.1
Diseases of the heart and arteries and enphritis	2.9	3.9	3.5	3.5	3.7
Other genito-urinary diseases	2.1	2.5	2.4	2.3	2.1
Diseases of the skin	2.6	2.6	3.1	3.7	3.5
Epidemic and endemic dis. except influenza	1.7	1.8	1.7	1.6	1.8
Ill-defined and unknown causes	1.5	2.2	2.0	1.6	1.7
All other diseases	5.1	7.0	7.4	7.5	6.6
Average number of males	154,385	135,470	158,090	154,165	160,023
Number of companies	35	35	32	27	23

*Exclusive of disability from venereal diseases.

Frequency of disability lasting eight calendar days or longer in the fourth quarter of 1933 compared with the same quarter of each of the four preceding years.

Anthrax in Pennsylvania

ACCORDING to the Medical News section of the *Journal of the American Medical Association*, for March 31, 1934, several cases of anthrax occurred in the mill village of Sackville, Delaware County, within the past year. The state health department reports that all of the cases were contracted within the mill or its immediate environs. About half the 200 inhabitants of Sackville worked in the woolen mill. The first case of anthrax, which occurred in March, 1933, was fatal, and the six persons infected since that time have recovered. Antitoxin was given in all cases, extra large doses being given in the six later cases. All cases were in mill

workers except two in children who were found to have played about the mill in spots where waste had been incompletely incinerated. Through the cooperation of the state department of labor and industry, safety appliances in the mill were reviewed and necessary improvements were made.

CWA Supports Carbon Monoxide Research

EFFORTS to diminish the amount of carbon monoxide that is formed in automobile exhausts and to convert the gas already formed into less harmful products will be carried on in a survey under the supervision of faculty members of Johns Hopkins University, with funds provided by the Civil Works Administration. Twenty-one unemployed chemists will be engaged for the study, newspapers announced, and laboratories will be constructed in a wing of Remsen Hall. —Medical News, *J. A. M. A.*, (March 3, 1934).

Clinic For Occupational Diseases

NEW YORK University and Bellevue Hospital Medical College has opened a special clinic for occupational diseases, with a laboratory equipped for the work. Cases of lead poisoning, silicosis, occupational dermatoses and benzene poisoning have already been handled in the clinic, which meets Wednesday afternoons. Physicians and industrial health workers have been invited to refer cases.—Medical News, *J. A. M. A.* (December 23, 1933).

Jefferson and Jenner

"PRESIDENT Thomas Jefferson in 1801 caused members of his family to be vaccinated. For this, he was attacked by his political enemies as a 'maniacal innovator' and criticized as a dangerous radical. Busy man that he was, Jefferson found time to carry on correspondence with Jenner and other medical leaders of his time and to preach the doctrine of immunization. When a delegation of Indians called on him, Jefferson not only had them vaccinated, but entrusted to their leader, Chief Litt Turtle of the Miamis, a supply of vaccine for the members of his tribe. Shipments of virus came to him and he distributed them far and wide."—Sam Antenow, Pres. A. D. S. Fellowship.

Seventh International Congress of Accidents and Diseases of Industry

THE Seventh International Congress on Occupational Accidents and Diseases will be held in July, 1935, at Brussels (Belgium) under the leadership of Dr. Gilbert. The object of the Congress is to coordinate the work of the Permanent Commission on Occupational Accidents and that of the Permanent International Commission on Industrial Medicine.

The program of the Congress will consist of official reports on questions which have been placed on the agenda and also independent reports on the same subjects.

The program has been divided into three sections, each of which will deal with two questions:

A. *Surgery.*

I. Delayed effects of injuries to the cranium
   a. Etiology and symptomology; Dr. Symonds (London);
   b. Pathologic anatomy; Dr. Armud (Marseilles);
   c. Diagnosis, prognosis, discussion; Dr. Lippens (Brussels);
   d. Treatment; Dr. Oller (Madrid) and Paul Martin (Brussels).

II. Traumatisms of the hand and fingers
   a. Immediate treatment of injuries to the hand and fingers; Dr. Neuman (Brussels) and Dr. Bohler (Vienna);
   b. Infection complicating such wounds; Dr. Yersin (Geneva) and Dr. Buzello (Grunswald);
   c. Plastic operations after such injuries; Drs. Lenormant and Yselin (Paris);
   d. Trophic and painful sequelae; Drs. Leriche and Fontaine (Lyons) and Dr. Magnus (Bochum);
   e. Clinical histories of wounds of the hand and fingers; Drs. Imbert and Paoli (Marseilles) and Dr. Gyselynck (Brussels).

B. *Occupational Diseases.*

I. The prevention of industrial dusts
   a. Methods of collecting and examining dusts, their measurement and enumeration; Dr. Middleton (London) and Dr. Bordas (Paris);
   b. The comparative value of the various methods of control of industrial dusts; Dr. Deladriere (Brussels) and Dr. Boerma (The Hague);
   c. What are the criteria for the selection of workers for employment exposing them to dangerous dusts; Dr. Etienne Martin (Lyons), Dr. L. Teleky (Dusseldorf), Dr. Sternberg (Vienna);
   d. What are the first warning signs indicating an intolerance of dangerous dust? Dr. Policard (Lyons), Dr. De-Net (Obourg lez Mons).

II. Pathologic action of gases escaping from veins of coal mines. Is there a pathologic effect caused by the repeated inhalation of minimal doses of such gases from coal mines?
   a. What is the nature of these gases, their detection, and prevention? M. Breyre (Paturage), M. Leprince Ringuet (Paris), Dr. Mund (Louvain).
   b. Physiologic and pathologic effects of these gases; Dr. R. R. Sayers (Washington), Dr. Elury (Wurzburg), Dr. Yandell Henderson (New Haven), Dr. Hautain (Fontaine l'Eveque).

C. *Joint Session:*

I. Objective manifestations of pain
   a. Psycho-physiology of pain; Dr. Biondi (Vienna);
   b. Pathologic alterations in the pain sense; Dr. Crouzon (Paris);
   c. The objective diagnosis of pain in the injured; Dr. Delaet (Brussels).

II. Electricity
   a. Pathologic conditions due to electricity; Dr. Aiello (Milan);
   b. Electric hygiene; Dr. Jellinek (Vienna);
   c. Pathologic anatomy; Dr. von Mayenburg (Zurich);
   d. Electric injuries; Dr. Stassen (Montegnee).

For information, address The Secretary General of the Congress, Dr. Leo Dejardin, 23 Rue du Commerce, Brussels, Belgium, *or* Dr. Fred H. Albee, 57 West 57th Street, New York City, who has been appointed American President of the National Committee for the Section of Accidents, and Dr.

Emery R. Hayhurst, Chief, Division of Hygiene, State Dept. of Health, Columbus, Ohio, who is American President of the National Committee for the Section of Diseases.

Radio Advertising

"THE Council's office has received a complaint concerning statements made in radio broadcasts advertising an accepted preparation. The manufacturer was asked to inform the Council what statements had been authorized. In reply, the firm sent a list of statements concerned directly with the Council acceptance of the product, but not the entire text of the advertising broadcast. Members of the Council found some of the statements objectionable in that they implied Council 'approval,' whereas according to the Council's rules acceptance does not mean recommendation of a product. Another objection was concerned with the firm's statement that the product was accepted 'by the A. M. A.', whereas it is only the Council that does the accepting. In the discussion it was brought out that for effective control it is necessary that the complete text of radio broadcasts be considered. It was pointed out that the question of radio broadcasts concerning Council-accepted products must necessarily be an increasing one, and means for adequate control were discussed. It was decided that all firms doing radio advertising of Council-accepted products be informed that the Council feels obliged to pass on the complete text of all radio broadcasts before they are released to the public over the air, and that adequate arrangements will be made for prompt action on such advertising copy."—*J.A.M.A.*, April 17, 1934.

Blindness Prevention

NATIONAL SOCIETY for the Prevention of Blindness, makes public its last annual report, which points out that five states—New York, Pennsylvania, Michigan, Nebraska and Massachusetts—now require the use of non-shatterable glass in all automobiles. Non-shatterable glass has also been perfected for use in spectacles.

"The worst tragedy of blindness lies in the fact that in the vast majority of instances it is absolutely preventable. There are more than 100,000 blind persons in the United States. Ignorance is usually the underlying reason for loss of sight, whether it be the result of disease or accident. The work of the National Society is, therefore, concentrated largely on pointing the way. Its function is to keep abreast of scientific and pedagogical knowledge and to inform the public in layman's language of such advances and how they may be applied practically in preventing blindness and saving sight. During the past year, for example, the Society had a staff member engaged solely in working with teacher training institutions, to provide adequate information on eye care and hygiene, and to guide classroom teachers toward participation in the school program of sight conservation. Approximately 26,000,000 children attend school in the United States. Many of them are accorded the benefits of vision testing, adequate lighting and hygienic surroundings, but millions do not have the advantages of good eye care. Not only must the school child's eyes be protected, but also he must learn how to protect them and how to use them properly throughout life. In our efforts to bring about more thoroughgoing protection of the eyes of industrial workers, we have cooperated with such organizations as the National Safety Council, the American Federation of Labor, the United States Bureau of Standards, the Greater New York Safety Conference, and various State Departments of Labor and Industry."

To provide facilities for educating children with seriously defective vision, the report states, there are now 430 "sight-saving classes" in the United States. The Society is cooperating with the Girl Scouts' organization in making available for distribution the Girl Scout Handbook in large type.

Four O'clock Pick-Up

"INSTEAD of afternoon tea which our English friends regard as an institution," suggests E. J. Poor, Chairman of the Board of the Hygrade Sylvania Corporation, "why not a more practical kind of stimulus? In discussing this matter of four o'clock fatigue with Dr. Henry G. Carroll, who supervises the eyesight of our office and factory personnel at the Salem (Mass.) Hygrade lamp plant, I learn there are three simple expedients, each quite effective by itself:

"First, and most important from the standpoint of that greatest cause of fatigue, eyestrain, the illumination may be doubled towards the middle of the afternoon. The greatly increased light immediately reduces eyestrain and the corresponding drain on the human system. That tired feeling may largely disappear.

"Second, vitiated air or poor ventilation may give rise to four o'clock fatigue. The air may be refreshed by throwing open the windows for a few minutes. We follow this practice in our Salem office, morning and afternoon.

"Third, a bit of chocolate or candy may be indulged in, or even a block of sugar, serving as immediate fuel and energy for lagging mind and muscles."

Haven in the Later Days

UNITED STATES Board of Trade, Washington, D.C., publishes a survey of non-charitable, self-supporting, old people's homes. For investments varying from $1,000 to $7,000 "and other considerations," a business executive may purchase a life annuity of home comforts in upwards of three dozen "retreats" in well distributed localities from coast to coast. Nor are these parking places for the aged limited to business executives, for, through special arrangements, their wives are also eligible to admission. Members of these homes may come and go as they like, at whatever time suits them. They may also entertain their friends, even in their own rooms, which in many instances are filled with their own furniture. Private garages in some instances are also provided for automobiles. These enterprises are in fact family-like club centers, maintained in cities or removed from the battle field of commerce; not a few of them are rural estates, or resort hotels, acquired and maintained through endowments insuring their permanency of unkeep and operation. In some instances they have been successfully functioning for over half a century. The discovery of these highly respectable havens of rest for retired business executives came about through an attempt to solve the problem of "After 65-What Then?", prompted by the present economic condition when members of the second oldest trade organization of America set about to find a panacea for those who, through no fault of their own, have awakened to the realization that their carefully harbored life accumulations

were impaired if not endangered. It was then that the executives of the United States Board of Trade learned that several far-seeing captains of industry, wizards of finance, and learned professional men had "organized" for mutual protection, had built and were actually maintaining varied types of "retreats" from the simple life to those of palatial splendor, but none of them, for obvious reasons, needed to advertise their undertakings accomplished to insure a "full house count" since many have a lengthy waiting list.

Employee Activities

NATIONAL BELLAS HESS, INC., mail order company, Kansas City, Mo., has adopted a cooperative group insurance program for 550 employees providing a total of $600,000 life insurance, with individual benefits ranging from $1,000 to $5,000.

THE B. F. GOODRICH COMPANY, and subsidiary companies in the United States and Canada, have adopted a retirement pension plan for all classes of employees, 21,000 of them. The plan assuring an income to men and women on retirement, will result, it is estimated, in the accumulation for $1,500,000 for company employees annually; it was made effective through the purchase of the largest pension policy ever written by Aetna Life, of Hartford, Conn. The pension amount will depend on the length of the employee's membership in the plan, and is based on average weekly earnings. Employees who participate will make small weekly payments and the company will make the necessary additional contributions. If an employee who joins the plan dies or leaves the service before retirement, his contributions are returned in full with 3½% interest compounded annually, or in the event of his death the amount is paid the beneficiary. Retirement will generally come at 65 for men and 60 for women; pensions will begin on the first of every month after retirement and continue monthly thereafter as long as the employee lives. Before retirement the employee may select one of several optional forms of pension payment; without dependents or beneficiaries he can receive an individual pension, the income ending with death; where he has a wife dependent upon him he may choose a joint pension with reduced payments. After the death of either himself or his wife, half of the income is paid as long as the survivor lives. A third option gives a reduced pension as long as the employee lives after retirement, but if death occurs before an amount equal to the cash value at retirement is paid, the remainder would be paid to the beneficiaries. Employees leaving the service of the company before pension payments begin may take the cash value equal to their total contributions with 3½% compound interest, or they may receive the amount of pension for life beginning at normal retirement age which their total contributions to the plan provide. Membership in the pension plan is entirely voluntary.

Write for Detailed Information

About: (and mention *Industrial Medicine*) To:

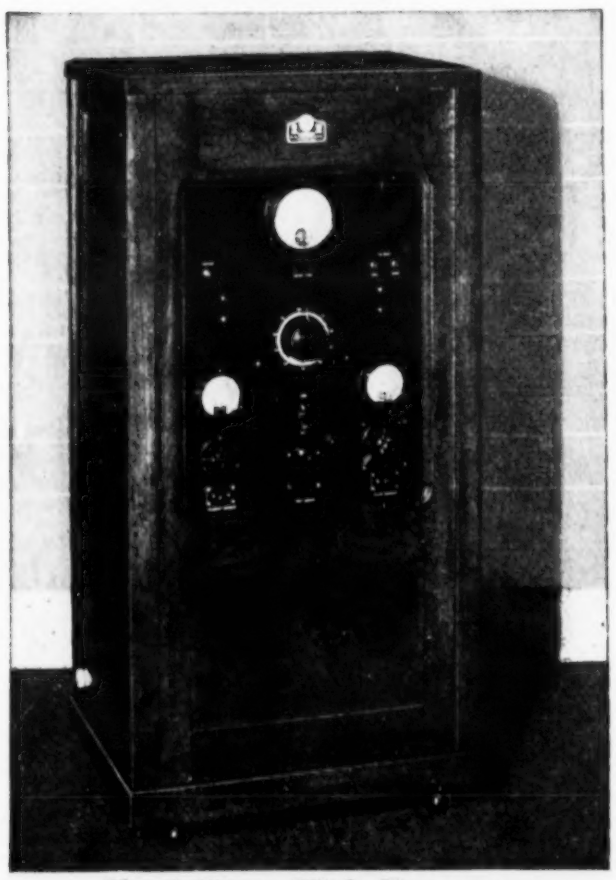
The Items and Things Herein Described — The Manufacturer Whose Name and Address Are Given

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY announces a new air cooler, the "mobilaire." This is a portable room cooler; it supplies a flow of cool, dry air. Rubber-tired castors in the base permit it to be wheeled easily from room to room. No larger than a steam radiator or a radio console, the "mobilaire" contains a fan, cooling coil, and a condenser for circulating a refrigerating fluid — complete equipment for cooling, dehumidifying and circulating the air. An average size office, living room or bedroom can be cooled in the hottest mid-summer weather by its refrigerating capacity of one-half ton which is equivalent to the melting of one-half ton of ice every 24 hours. It circulates sufficient air to provide from eight to 10 complete changes of air in the room every hour. The cabinet is available in attractive finishes of grain walnut or mahogany, or in a modern blue green finish with an inlaid Micarta panel. Quietness is one of the outstanding features; tests disclose that it is quieter than the 10-inch fans commonly used in homes and offices.

BARD - PARKER COMPANY, INC., Danbury, Conn., makers of the Bard-Parker detachable blade knife and other surgical instruments, thus describe their renewable edge scissors: "They follow closely the shape, construction and balance of the conventional scissor. The renewable edges are supported their full length by the scissor frame, giving them the rigidity of the solid scissor. There are no catches, springs or clamps to impair sterilization. The edges are locked onto the frame in the correct position by an ingenious device. The scissors are made of highly polished stainless steel, resistant to rust and chemical corrosion. The edges may be easily removed and both edges and scissor frame cleaned separately before sterilizing. The surgeon has always been faced with the problem of keeping his cutting instruments sharp. Resharpening has always been costly and often unsatisfactory in results. The detachable blade knife solved part of this problem. It seems to us that the renewable edge scissor solves the remainder. Renewable edges are made to standard specifications from the raw material through hardening and tempering to the finish grinding. By simply replacing dulled edges with a new keen pair of edges, the surgeon has in effect 'new scissors for old.' The original 'set' of the scissors remains undisturbed and the cutting edges are uniformly sharp, neither of which is possible with reground scissors. Uniform sharpness of cutting edges is considered a valuable aid to operating efficiency. The hospital has been faced with the problem of not only resharpening their scissors but replacing them as well, when worn out from repeated grindings. Renewable edges completely eliminate the necessity of resharpening. at the cost of 16 2/3 cents per pair, they effect a substantial saving over the average cost of resharpening. Since renewable edge scissors are not subject to destruction from repeated grindings, their useful life is greatly increased over that of the conventional scissor, reducing the necessity and expense of replacements to a minimum. Furthermore, renewable edge scissors may be kept in constant use by simply changing the edges. This enables the hospital to reduce the quantity of scissors formerly required for substitutes during resharpening. Among the several models of renew-

able edge scissors offered by Bard-Parker is an offset dissecting scissor which should be of particular interest to the surgeon. This scissor combines the operating visibility of the conventional curved scissor with superior cutting performance. The offset follows a straight line instead of cutting scallops. The straight edges produce a cutting efficiency not mechanically possible with curved scissors. Other surgical scissors now available with renewable edges are a 5½" and 6¾" straight dissecting, Mayo type and a 5½" straight operating with either double sharp, sharp and blunt or double blunt points."

H. G. FISCHER & CO., INC., Chicago, write as follows: "A good many physicians are expressing interest in short wave therapy—the heating of body tissues by means of short wave, high frequency apparatus, as distinguished from the ordinary or conductive type of diathermy. An ordinary diathermy unit generates waves of 300 to 400 meters in length. A

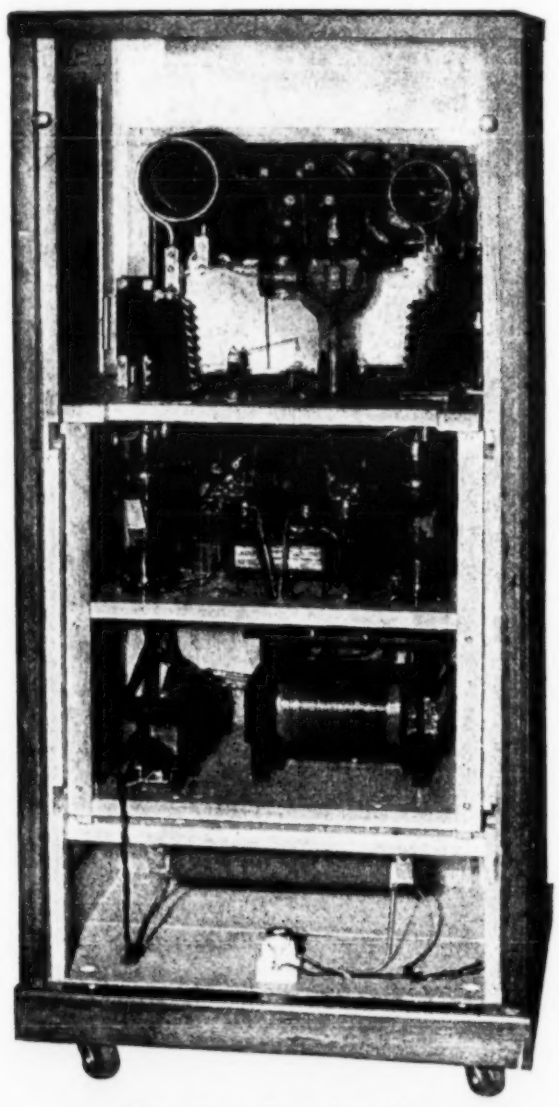


Short Wave High Frequency Apparatus

short wave, high frequency apparatus generates or induces waves as short as 20 to 25 meters (shorter waves are possible). Generally short wave apparatus producing frequencies upwards of 10 or 12 megacycles (10,000,000 to 12,000,000 oscillations per second) is used. The apparatus illustrated here is constructed to produce a frequency of 13.4 megacycles.

"Both diathermy and short wave apparatus have the same function to fulfill when used to heat tissues. With diathermy units, however, it was always a mooted question as to how successfully deeper structures could be heated, the current naturally following the paths of least resistance, with surrounding tissues being heated by conduction. Short wave, high frequency apparatus, on the other hand, involves a different principle. The patient receives no current from the apparatus itself. A new or secondary current is induced in the patient, i.e., in that part between the condenser electrodes, and the result is equal or almost equal heating of all the tissues within the field. If anything, heating is somewhat greater in tissues of higher resistance.

"In view of the even distribution of heat, it is reasonable to assume that the blood supply to the treated parts would be affected more favorably than could be possible with ordinary diathermy where heating is not even, or



Showing Construction

deep. In any event, short wave therapy has made great strides in various parts of Europe (in many centers having almost displaced diathermy) and many American physicians commend its use, considering it, in its field, as superior to diathermy.

"Laquer and Piza (*Archives of Physical Therapy X-ray, Radium*, November, 1933) propose the interesting question whether a utilization of a high frequency current between 15 and 30 meters wave length may be regarded as a short wave treatment proper or as the equivalent of an intense diathermization. The answer is yes, both from a physical and clinical standpoint.'

"A short wave, high frequency machine is easier and simpler to use than an ordinary diathermy unit. The electrodes are not in contact with the skin —clothing need not be removed. Almost as soon as the current is turned on, the patient feels a gentle, comforting warmth, the psychological effect of which makes him feel from the beginning of the treatment that something is being done for him. But it is not our function, of course, to attempt to point out either physiological or psychological effects. The sole point we emphasize is that with short wave, high frequency apparatus it is possible to get as much heat as is wanted, wherever it is wanted. That short waves have functions or effects other than heating tissues is known, but further research is necessary.

"From the point of view of construction, a short wave, high frequency apparatus is in essence a radio broadcasting set. One advantage that appeals to many physicians is that it does not disturb radio reception. In the FISCHER Unit the current volume is under fine control; a circuit breaker protects the tubes against accidental overload; for treatments not requiring large amounts of power, this circuit breaker may be left open."

H. CARSTENS MFG. CO., 565-7 W. Lake St., Chicago, Ill., makes the portable electric lamp described by Drs. Corbett and Taylor in their article on "Continuous Radiant Heat Therapy—in Osteomyelitis of Metacarpals, Metatarsals and Phalanges" on page 273 of this issue, and advertised on page 327. The lamp used by Drs. Corbett and Taylor was specially made some time ago, but the company is now in a position to furnish the lamps as may be required.

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Order Your 1934 International Medical Annual

WE NOW have ready the 52nd issue of this famous annual review of the world's progress in medicine, surgery and the specialties. The number of copies available for those who are not regular subscribers is limited. Better get your order in now. There is no other publication in existence which reviews the entire field in a single volume. Abstracts in medical journals do not serve the same purpose. The International Medical Annual is unique and serves a professional service second to none. The volume is a necessary supplement to all the medical literature you possess and brings it up-to-date. Thirty-three high authorities in their respective fields with the assistance of a permanent staff have surveyed the medical literature of the entire world through the past year, and now tell you, concisely, just exactly what has proved to be new and valuable, rejecting all that is of doubtful worth. The material is arranged for easy reference, running alphabetically from abdominal surgery to yellow fever, with frequent cross references and a good index, the whole 600 pages abundantly illustrated, including colored plates, price only $6.00. The contributors include such famous names as Letheby Tidy, Hey Groves, Rendle Short, Tudor Edwards, John Frazer, Watkyn-Thomas, Langdon Brown, Duke-Elder, Robert Hutchison, Hamilton Bailey, Beckwith Whitehouse, Stanford Cade, Lockhart-Mummery, De Courcey Wheeler, and Leonard Rogers. A large percentage of the references is to American literature, but the work is thoroughly international in scope. An ideal book for immediate reading and frequent reference.

Heitzmann

URINARY ANALYSIS AND DIAGNOSIS

By LOUIS HEITZMANN, M.D., formerly Professor of Pathology and Bacteriology, Fordham University, School of Medicine, New York. Sixth revised edition, cloth, xxi + 366 pages, 131 illustrations, $5.00.

Here we have the sixth revised edition of what has been recognized for many years as the standard textbook on urinary analysis and diagnosis by microscopical and chemical examination.

Prompt, accurate and reliable diagnosis is still the greatest problem of the physician. When he is sure of his diagnosis any good experienced physician can confidently map out a line of treatment which will be effective in most ordinary cases. Ideas on and methods of diagnosis have changed somewhat with the years; laboratory procedures have multiplied. The X-ray has its place. Yet the first, the fundamental, the universally used procedure is still examination of the urine, and in the hands of a competent observer, who thoroughly understands the clinical implications and applications of all the facts and details supplied by such an examination, it is a diagnostic procedure of priceless value.

Whether you usually have specimens of urine tested at a laboratory or make the analysis yourself you should determine that the diagnosis must be your own. For that purpose you need to be well primed on exactly the information which Dr. Heitzmann, out of the depths of his long experience as an expert in this special field, gives you plainly, fully, yet concisely, in his book. Laboratory workers need the book of course, pharmacists, nurses, all who actually make the technical examination. Interpretation is the function of the physician, and it is for him this book is largely intended.

Only those tests are given which can be carried out by the general laboratory worker and by the practitioner, without the necessity of a completely equipped chemical laboratory. Greatest stress is laid on the microscopical examination and especially the microscopical diagnosis. When chemical analysis will not admit of a positive diagnosis, microscopic examination, if carefully carried out along the lines laid down in this book, will usually completely clear up the case. A thoughtful reading of this book will cause any physician to determine to pay more attention to the dignostic values of proper urine examination.

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"INDUSTRIAL TUBERCULOSIS" —that's the latest name for silicosis. It is a lawyer-made name; designed for the surest appeal to the non-technical comprehension of the jury. Everybody has an idea that he knows what tuberculosis is; counsel for the plaintiff hook up "industrial" with it —and the jury "hooks" industry. Depend upon the legal mind for that kind of cleverness. But such things are only hurrying the time when questions of technical fact will be determined by technical men • • • PNEUMONOKONIOSIS seems to have four spellings: pneumonokoniosis, pneumokoniosis, and both ways with "c" instead of "k." Writers on the subject have their preferences; we have usually observed them in their articles in this magazine — our own preference being not to attempt a standard, but to let the finally accepted form develop itself, as such forms have a way of doing • • • DR. ADELAIDE ROSS SMITH'S "Unreliability of the Physical Examination in the Diagnosis of Silicosis" (p. 277) strongly emphasizes the almost exclusive importance of the roentgenogram from the point of view of the physician in silicosis diagnosis. She brings definite evidence to support her conclusions—already concurred in by some other authorities. If there could be a general agreement among medical men on the place of the roentgenogram in silicosis diagnosis, counsel for the defense in silicosis suits would soon find their trial work less hopeless • • • SERICITE as a cause of silicosis (p. 307) may help to correct an impression which, on the basis of the study by Dr. Wm. R. Jones referred to in the editorial, seems to have been gaining ground among the industrial executives who will finally have to sign the checks for the judgments awarded in silicosis cases. The impression is that silica is of much less importance in silicosis than was generally believed prior to the distribution of Dr. Jones' article. The fact will be that silica is not less important, but that serecite, and possibly other substances, are more important than was heretofore understood • • • DRS. CORBETT AND TAYLOR describe their "Continuous Radiant Heat Therapy" (p. 273) as having been begun "about 15 years ago and used successfully in 75 to 100 cases" • • • DR. HART FISCHER'S Medical Department Manual reaches the classification of physical defects (p. 281)—a rigid list, but it is for *passenger* railroad service, and its justification, if any were needed, is such results as this: "Climaxing a five-year period of steady improvement in safety on the job, employees of the Chicago Rapid Transit Company in 1933 established an all-time record when time lost due to disability injuries averaged only one-twelfth of 1% of the total man hours worked. The record embraces the working hours of employees in all branches of the 'L' service, including shopmen, electrical workers, track repair men, switchmen and train crews" • • • DR. DAVIDSON'S "Industrial Compensation in the Soviet Union" (p. 291) is extremely interesting, particularly when read in connection with the "Soviet Doctor's Diary" (p. 317) • • • EMPLOYEE GROUP PROTECTION (p. 293) and EYESIGHT EXAMINATIONS (p. 294) are from the first hand experience of an industrial consultant. The first named is of special importance, in view of the great amount of attention now being given to group protection. C. RUFUS ROREM'S outline (p. 310) bears directly upon the matter, Mr. Rorem being so impressed as to warn the medical profession that "the organized medical groups must take some risks, both in being first in the field and offering the lowest rates, if insurance companies are not to take away this promising field from them" • • • DR. LAUTENSCHLAGER'S instalment of the serially-published "Workmen's Compensation" (p. 297) may seem to be getting into theory, but it always comes back to the specific subject of the study: workmen's compensation. Even in the theory, the Dr. has some excellent ideas. And surely some excellent ideas are needed—as F. ROBERTSON JONES, in his "Workmen's Compensation—A Growing Burden on Industry" (p. 314) ably and interestingly proves • • • The convention season is beginning. Next month's issue will reflect the important May meetings; the July number will cover those in June. And the forthcoming "Silicosis Racket" is scheduled for July. *It will be interesting* • • • Readers of *Industrial Medicine*, have seen DR. HART FISHER'S name and position at the head of the instalments of his Medical Department Manual often enough to know that he is Chief Surgeon of the Chicago Rapid Transit Company. But the industrial connections of the other physicians and surgeons whose names appear at the head of our editorial column (p. 307) are, perhaps not so well known. DR. VOLNEY S. CHENEY is Medical Director of Armour and Company, and Secretary-Treasurer of the American Association of Industrial Physicians and Surgeons. DR. OTTO P. GEIER is Director of the Employee Service Department of Cincinnati Milling Machine and Cincinnati Grinders, Inc. DR. LEROY P. KUHN is Chief Surgeon of the Lumbermen's Mutual Casualty Co., a director of the Central States Society of Industrial Medicine and Surgery, and a Director and Past-President of the Institute of Traumatic Surgery. DR. RICHARD S. FARR is a Consulting Orthopedist of Rochester, N. Y., and one of the Editorial Board of the New York State Society of Industrial Medicine. And our Consultant, DR. C. O. SAPPINGTON, is a Consulting Industrial Hygienist. This editorial staff has the active cooperation and assistance of the Directors and Officers of the A. A. I. P. & S. (p. 313), the Editorial Board of *The Industrial Doctor* (p. 318) and the Officers, Board of Governors and Editorial staff of the Central States Society (p. 320). *Industrial Medicine* is thus, as a medical magazine, *professionally edited*. Its compliance with the standards of the American Medical Association in advertising respects was indicated on the April number's "Last Page" • • • THE SILICOSIS RACKET is largely a parasitical attack on industry; its growth and effects are expensive, and they come, in so far as the "racket" element is involved, from the *outside*. But there is another situation in industry which is also expensive, and needlessly so, and it comes practically altogether from *within*. It is a situation which the M.D. has been nearly powerless to prevent, although he would like to prevent it and could easily do so. An early number will treat it thoroughly—under the title: "Industry's Sacred Bull" • • • EVEN in these times of depression aftermath, when the going is hard for every kind of business, there are still some men who hang on to their God-given ability to see visions and dream dreams. We, our whole editorial organization, have a vision of the future of *Industrial Medicine* that will make all previous issues—as Cap'n Henry, of radio's Show Boat, says—"Only the beginnin', ONLY the beginnin'."